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THE BRICKBVILDER

AN ILLVSTRATED MONTHLY MAGAZINE DEVOTED TO THE ADVANCEMENT OF BRICK ARCHITECTVRE - SVBSCRIPTION PRICE TWO DOLLARS AND FIFTY CENTS A YEAR - SINGLE NVMBER TWENTY FIVE CENTS -

VOLUME TWO

JANUARY, 1893.

Geo. F. Newton, des.

THE COLLINS PRESS, 15 MILTON PLACE, BOSTON.

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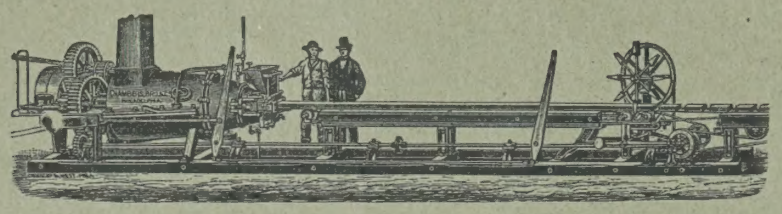

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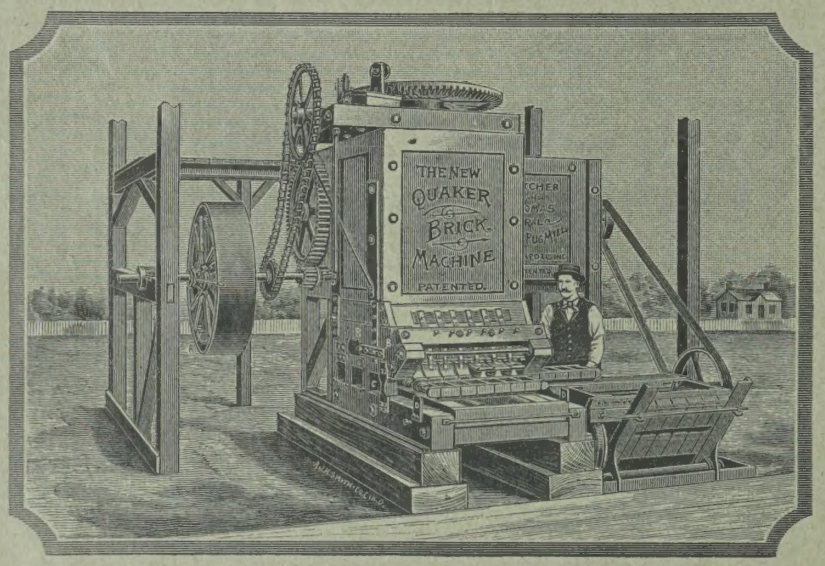

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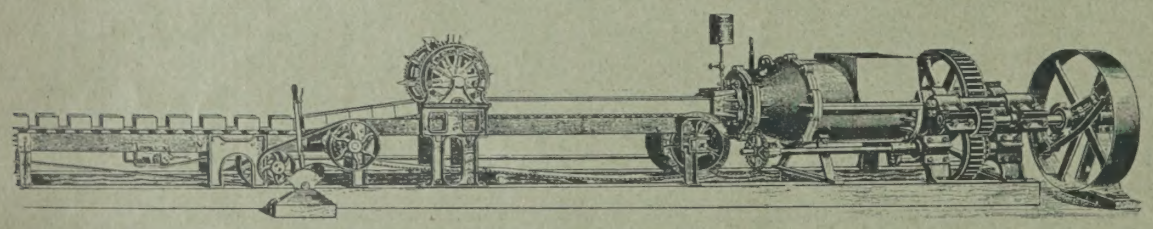

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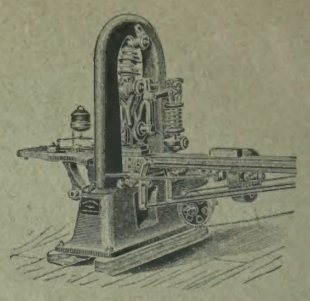

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THE BRICKBUILDER

VOL. II. BOSTON, JANUARY, 1893. NO. 1.

ARCHITECTURAL TERRA-COTTA.

I PROPOSE to divide my subject under the following heads, namely, the origin of terra-cotta, its durability, the material of which it is made, the processes of its manufacture, and the mode of its application, and to say a few words on each of these points as far as a limited space will permit.

THE ORIGIN OF TERRA-COTTA.

In searching for the origin of terra-cotta we must let our thoughts go back to the most remote periods of which we have any historical record, and in these ancient times we find a material answering in substance to the terra-cotta of to-day, being largely used for the purpose of building. It is said "that the children of Seth, the son of Adam, built two pillars, one of brick and one of stone, and they inscribed upon each of them the discoveries they had made concerning the heavenly bodies, so that their inventions might be preserved to mankind, and not be lost before they became sufficiently known." This is the earliest record we have of any kind of building material; we are told previously of their building cities, but no record is made of the material used. I think from this single record we may reasonably infer that brick was a general building material in those ancient antediluvian days. I am aware that the term "brick," as technically applied and understood in our days, is restricted to blocks of burnt clay of a limited size, not exceeding such as may be easily taken up and laid in the building with one hand, whilst the other is left free for the use of the trowel, and that the term "terra-cotta" applies only to blocks of a larger size, into which only the best selected clays are convertible. But in this pillar of brick I think we may discern the employment of both small and large blocks; and that the term "terra-cotta" being then unknown, the whole is spoken of as brick. Whatever small blocks there may have been used, it is only reasonable to suppose that larger ones in the shape of tablets would be required, on which to model or inscribe the representations of the heavenly bodies, illustrative of the manner of their revolutions as then believed in, or ascertained.

Then coming to the days immediately following the deluge, we read that the families of the sons of Noah, as they journeyed eastward, found a plain in the land of Shinar and dwelt there, and they said one to another, "Go to, let us make bricks and burn them thoroughly, and they had brick for stone." I think that from the mention of brick in these particular instances we may reasonably conclude that brick also entered very largely into the other building operations of the time, and that the cities built in those periods, such as Nod and Enoch before, and Babylon, Sidon, and Nineveh after, the flood, were in great part built with that material. We have corroborative evidence in support of this supposition in the masses of brickwork, and many fragments of ceramic ornamentation which have been unearthed and brought to light by the researches that have been made in what are supposed to be the remains of those ancient cities. Of course it is impossible to determine with any degree of certainty as to what part of these remains, if any, belong to that very early period of which we have been speaking, but they are certainly the most ancient that have yet been discovered. Enough, therefore, I think has been said to show that the manufacture of terra-cotta is no new invention, but one of the earliest, if not the very earliest, which history has recorded, or antiquarian research has revealed.

Coming down to more modern times, the technical term "terra-cotta," being in itself Italian, at once points to the source from whence its present extensive and extending use as an architectural or building material is derived. It was, no doubt, in the first instance, applied by the Italians more to the purposes of ornamentation than construction, and this very probably because from its plasticity they could easily treat it and bring it into any artistic form they might desire.

Its present use in this country as a constructive material seems to have arisen from a felt want of some good, reliable building material that would retain its color, and successfully resist the decaying influence of the atmospheric gases, especially in large towns and cities; the best and most carefully selected stone having been found to fail in these respects.

ITS DURABILITY.

I think that the principal value of terra-cotta lies in its durability, and that its continued use as a building material greatly depends upon this. Whether it will fulfil this condition is, as yet, a matter of experiment. It is now on its trial, and time alone will disclose it. Its introduction into this country being of so recent a date, it may be thought premature to make any positive assertion; but I think we may safely say, without fear of contradiction, that from the observations we have been able to make during the few years it has been in use, and from the chemical experiments that have been made upon it, there is every reason to believe that it will answer the purpose admirably. In the first place, terra-cotta being impervious to wet, or nearly so, it will not vegetate as stone is liable to do; and the small particles of dust, soot, etc., which settle down upon it, and which in the case of stone so soon disfigure it, changing it from white to black, are, upon every shower of rain that falls, washed away, leaving the color just as at first. And secondly, that most destructive influence of all with which stone has to contend, — the quick succession of moisture and frost, which so rapidly demolishes a stone building, crumbling away its copings, projections, and mouldings, — this decaying influence has little or no power upon terra-cotta. Of course, it will be understood that the foregoing remarks are intended to apply only to well-burnt terra-cotta, made from a suitable clay. There is bad terra-cotta as well as bad stone, and I think that of the two the bad stone is the preferable. Nothing can be more objectionable than terra-cotta made of unsuitable clays that will not stand the maximum of heat, or made of good clay, but only partly or imperfectly burnt. The object that is aimed at, and which I think has led to the adoption of terra-cotta — its durability — is defeated by this inferior class of goods. The making of it cannot be too severely censured, or its use too roughly discarded. In these days of sharp competition, when we are too apt to look more to the cost than the quality of an article, there is great danger of this rubbish in the shape of half-burnt clay getting into the market, much to the detriment and permanent injury of the genuine and reliable material. I think that architects have the remedy of this in a great measure in their own hands, by looking well to the quality of the material they recommend. A perishable material is dear at any price. Although it may cost slightly more to obtain a durable one, it is by far the cheapest in the end. Sometimes the durability of terra-cotta is materially affected by the manufacturers endeavoring to meet the expressed wish of the architect that it should be of a certain tint or color which is unnatural to it when treated in a legitimate way. A little lighter or a little darker may seem an easy thing to attain, but many times it means the sacrificing of durability in order to satisfy a questionable taste or fancy. To obtain the desired color the material has to be heated artificially; it must be either under- or over-burnt; or there must be an admixture of other, and often inferior, clays with the genuine, and thereby the whole substance is deteriorated. If terra-cotta is to stand its ground, and prove itself a durable first-class building material, I think it would be well for the manufacturers themselves to be honest, and to exhibit plainly what their own particular clays will produce of a reliable character, without any injurious admixture or composition, and not be easily induced to deviate from it. To take a good material as a base on which to heap as much of an inferior kind as it is able to bear, or as much as is compatible with its salability, will, in the end, prove most suicidal to the manufacturer's interest.

THE MATERIAL OF WHICH IT IS MADE.

The material, as you are well aware, is clay. It is, then, concerning the composition and manipulation of the clays that I have to speak, and more especially to point out those that I consider the most suitable for the manufacture of terra-cotta. In this I think it very probable that we differ from the most ancient practitioners. We cannot suppose that the ancients would, in the first instance, delve into the bowels of the earth in order to ascertain if other and better clays could be found for their purpose. They would, in all likelihood, make use of that which came the readiest to their hand. In this case, they would naturally begin with the surface clays of the alluvial plains, which were easily obtained, and, because of their native plasticity, easily heated and moulded, or fashioned into form by the best methods they then could invent.

The clays of which the best terra-cotta of to-day is manufactured, as a rule, with few exceptions, have to be raised from a distance below the surface of the earth. This is generally done by means of sinking shafts and mining for it in the same way as for coal, or if by open work, a large amount of superincumbent earth has to be removed in order to obtain it. A hard, compressed substance of clay is by this means obtained, which, if free from foreign organic matter, and possessing the proper stamina of a genuine clay, is the most serviceable that can be obtained for this work.

However desirable it may be to make use of the surface clays of the country for the manufacture of terra-cotta, because of the ease by which they may be obtained, and of their native plasticity, this is more than counterbalanced by the absence of strength and durability in the material they produce, and by its liability to crack, twist, and go out of shape in the manufacture. Whatever scientific knowledge or experiment has discovered, or may discover, of the nature of its deficiencies, I think it is impossible at a reasonable and remunerative cost to infuse into this surface clay that which will enable it to take rank with such raw material as naturally possesses in itself the qualities which we look for; and it is very doubtful whether this can be effected at any cost whatsoever.

The chief substances of which all clays are composed are scientifically called alumina and silica; but these substances very much vary in their proportions, and as they

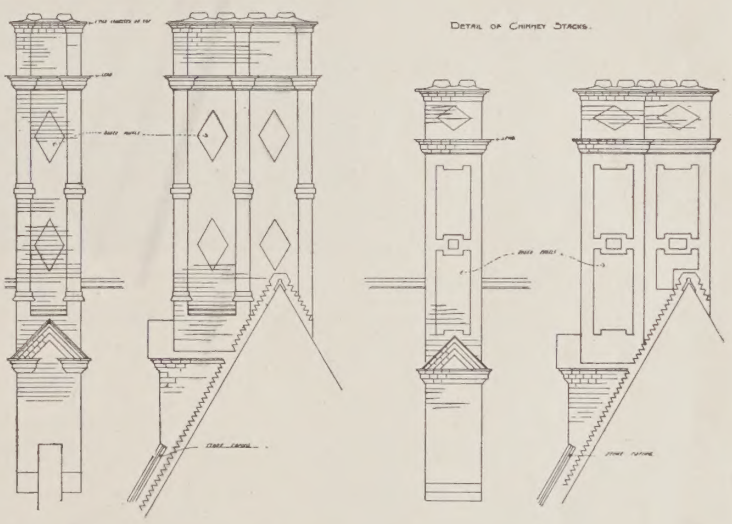
vary, so the strength and durability of the material they produce are increased or diminished. Alumina is an earth that may also be called a metallic base. It cannot be dissolved in water, but it has a close affinity for it, and when combined with water it yields a tenacious and plastic paste. Silica differs from alumina in not being a base: it is rather of the nature of an acid, for it will combine with the base of the alkalies, forming a class of salt-like substances called silicates. Silica is therefore able to combine with the base alumina, and produces silicate of alumina, which is really the constituent of the clay, rather than alumina alone. The presence of silica in very small proportions, as in the clayey top soils of the fields, seems only to prevent the extreme closeness of the clay; but in large proportions under the action of heat is a cementing or consolidating substance. It is therefore on the proportion of silica which the clay contains that the strength and durability of the material depend, and in the manufacture of terra-cotta it is above all things desirable that the clay should possess its adequate proportion of silica. The natural clays that are most favorable to the production of the best terra-cotta are those which contain from sixty to seventy per cent of silica, twenty to thirty per cent of alumina, and a small proportion of foreign materials, chiefly ferruginous oxide. These clays are to be found in abundance in many parts of the country, and only require the necessary labor and expense of excavating or mining in order to obtain them. In some few instances the surface plastic clay of the vale comes near to the required standard; in others, certain strata in the deep banks or beds of red marl approach it; but the best and most plentiful supply is in the anhydrous strata of the coal measures, varying in thickness up to about five feet. Of course the whole substance of these clays is not suited to the manufacture of terra-cotta; but with a judicious selection and amalgamation, the best and most reliable material is produced.

I think that I shall not be charged with undue partiality when I say that one of the most suitable beds of this clay available at this time is that which underlies the coal-measures at Glascote, in the neighborhood of Tamworth, and which is now at the service and use of Messrs. Gibbs & Canning. The superiority of this clay is manifest in the works they have already produced from it, to particularize which I would name the Natural History Musuem, South Kensington. There are many other buildings to which I might confidently refer; but this one alone is enough to convince the most casual as well as the most searching observer, that the clays of which I am now speaking are an invaluable material for the production of terra-cotta.

There is also one metallic oxide, that of iron, which enters more or less into the composition of all genuine clays in some form or other, and pretty largely into some. This has little or no effect upon the strength or durability of the material, but only acts as a coloring agent. Its presence in large or small quantities makes the difference in the color, varying from a slightly tinged buff to a dark red. The action of the heat upon it brightens up or brings out the color, and the greater the heat that can be brought to bear upon it without damage to the material the darker the color becomes. Yet it is impossible for any scientific research or analysis to decide with any degree of accuracy what shade of color any clay will produce.

They may be able to ascertain the quantity of the oxide it contains, but these are so varying in their results that experiment alone can decide the tint it will burn. Of course it will be understood that I am now speaking of the colors which are natural to the clays, and not of any artificial ones that may be produced; this properly belongs to the manufacturing process. But I may here say, while speaking on the question of color, that the color properties of any clay may be increased or diminished by the addition or extraction of the oxides, and that other colors not natural to the clay may be produced by the aid of chemical ingredients, such as cobalt for instance, which produces a dark blue gray; but it is doubtful whether the additional cost of all such productions will not exclude them from forming part in any extensive building operations.

(To be continued.)



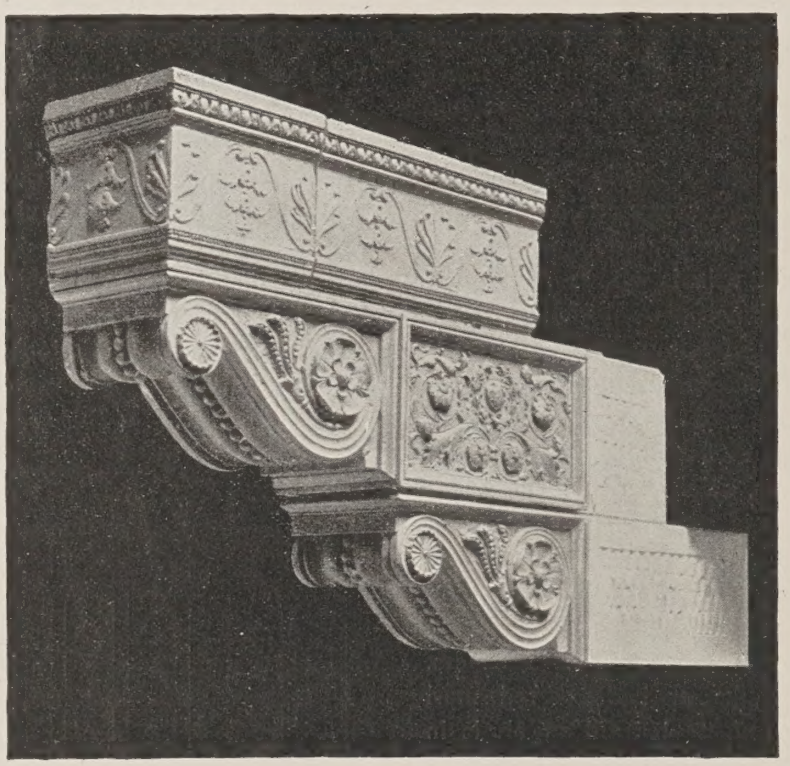
CHIMNEYS OF BUILDINGS ON MOUNT STREET.
Ernest George & Peto, Architects, London.

A very neat souvenir programme of the seventh annual convention of the National Brick Manufacturers Association, to be held at Louisville, Jan. 24 to 28, has been issued by J. W. Penfield & Son, brick machine manufacturers, of Willoughby, Ohio.

In building brick houses in positions where they are not protected by surrounding property, do not forget that hollow walls will add greatly to the convenience of the occupiers. They will render the house cooler in summer and warmer in the winter, and will assist in materially keeping the house dry. The cost of hollow walls is only very little higher than that of walls built solid. — *Canadian Architect.*

A FAIENCE BRACKET.

The photograph on this page is from one of the faience brackets supporting a desk in the Worcester Five Cents Savings Bank, recently designed by Messrs. Earle & Fisher. This desk, together with much of the other interior work, was executed by Messrs. Atwood & Grueby, of Boston. The peculiar light in which it is placed makes it impossible to secure a photograph of the desk for publication, but we hope to publish a drawing of it by Mr. J. A. Schweinfurth in our next number.



FAIENCE BRACKET.
FOR DESK IN WORCESTER FIVE CENTS SAVINGS BANK. EARLE & FISHER, ARCHITECTS.
ATWOOD & GRUEBY, MAKERS.

In an old number of the *Building News* a correspondent, in the department of "Intercommunication" inquires regarding cleaning up old brickwork. Two numbers later, in the same department, appears this answer, to which we fully subscribe (the Italics are ours): —

"The only decent way to treat old brickwork is to pull it down, if you can't leave it alone. Of other ways, the least indecent I know of is to rough-cast it. As for geting it up 'equal to new,' *where do you expect to go when you die if you do such things as that?*'"

NOTE ON THE COMPRESSIVE RESISTANCE OF BRICK.

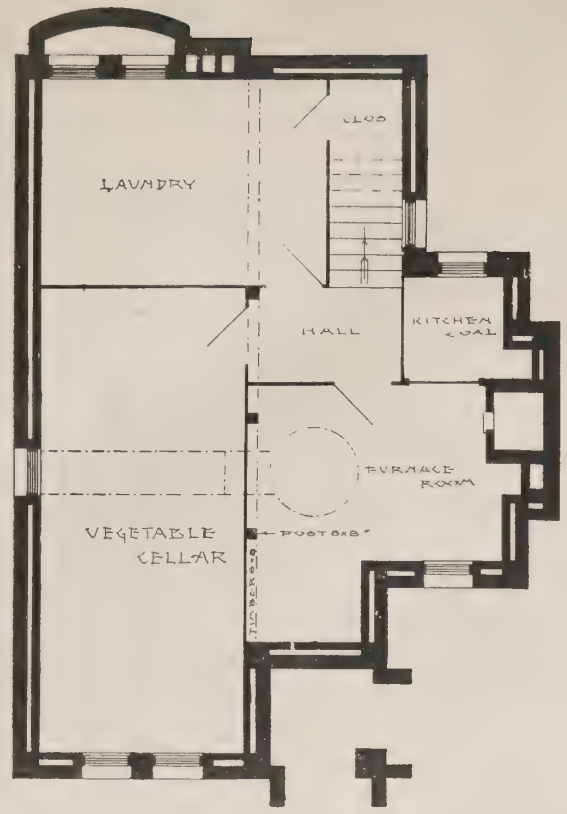
THE writer has previously called attention to the fact that the flatness of the pressed surfaces greatly affect the crushing strength of cubes of brick or stone. The present note is written to present the results of some experiments made to determine the effects of different methods of preparing the pressed surfaces to the test specimens.

In testing some paving brick, the writer made some preliminary experiments by preparing the surfaces in five ways, viz.: 1, grinding as nearly flat as possible upon the convex side of an emery stone, and crushing between self-adjusting parallel cast-iron plates; 2, removing the irregularities of the surface, and crushing between blotting paper; 3, removing the irregularities of the surface, and crushing between straw boards; 4, removing the irregularities of the surface, coating with plaster of paris and placing under slight pressure until set (12 to 24 hours), and then crushing; 5, coating with plaster of paris which was afterwards ground down on a sand-paper disk, to the surface of the brick, so as to leave a minimum thickness with a perfectly flat surface, and then crushing.

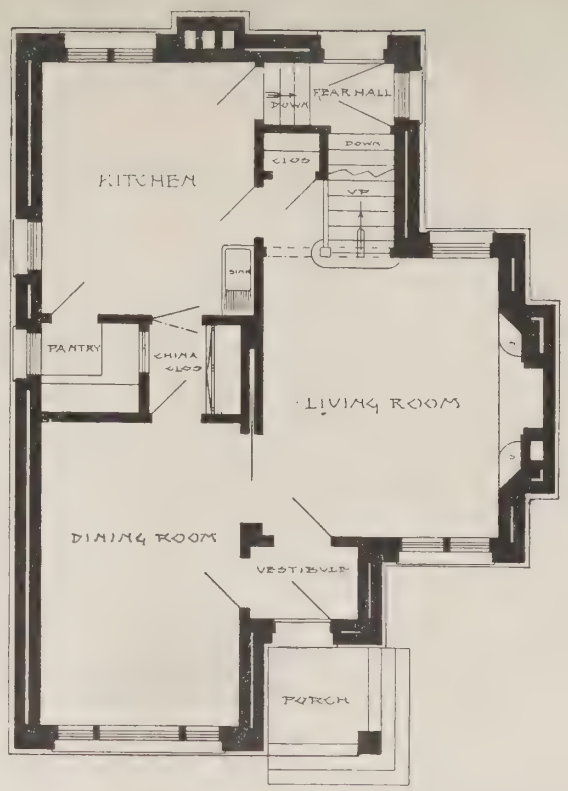
After a considerable number of experiments, it was decided that there was no great difference between the first three methods, while the difficulties in applying the last two were so great as to render them worthless. With a grade of brick which was quite uniform in quality, the first three methods gave 7,000 to 9,000 pounds per square inch as the crushing strength of cubes. The fairly close agreement of the results was considered satisfactory evidence that the method employed secured the full strength of the brick. Subsequently the writer decided to determine the strength of cubes when pressed surfaces were prepared with the greatest care. The samples were prepared on a rubbing bed at a marble dressing establishment, by the ordinary workmen, with instructions to secure perfectly flat surfaces. The brick were of the same grade as those referred to above, and many of the samples were the second halves of the brick used in the first experiments. The strength of the carefully prepared cubes ranged from 16,000 to 21,000 pounds per square inch, and averaged a trifle over 18,000.

The conclusion derived from the two series of experiments is that an almost imperceptible difference in the flatness of the test specimens makes a very great difference in the strength. Obviously this difference is greater the harder and more brittle the brick or stone. It is perhaps well to repeat that tests of compressive resistance of blocks of stone or brick are useful only in comparing different samples, and gives no idea of the strength of masonry constructed of these materials.

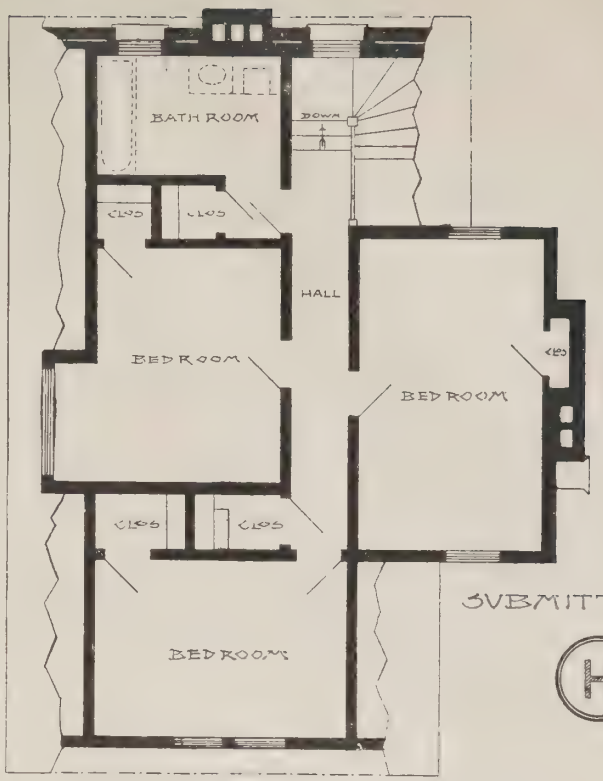
It is interesting to note that Rankine and Trautwine, standard British and American authorities, in editions of their engineers' manual, published a few years ago, give the crushing strength of the best brick at 1,100 and 4,000 pounds per square inch respectively, while there has recently been tested in the university testing laboratory three lots of brick which averaged from 15,000 to 18,500 per square inch. The difference is probably due mainly to improvements in the manufacture of brick. The crushing strength of granite, when tested under similar conditions, is from 12,000 to 20,000.— *Ira O. Baker, Professor of Civil Engineering, University of Illinois, in the Technography.*



-BASEMENT-PLAN-



-FIRST-FLOOR-PLAN-
-SCALE 3/16 = TO 1'-



-SECOND-FLOOR-PLAN-

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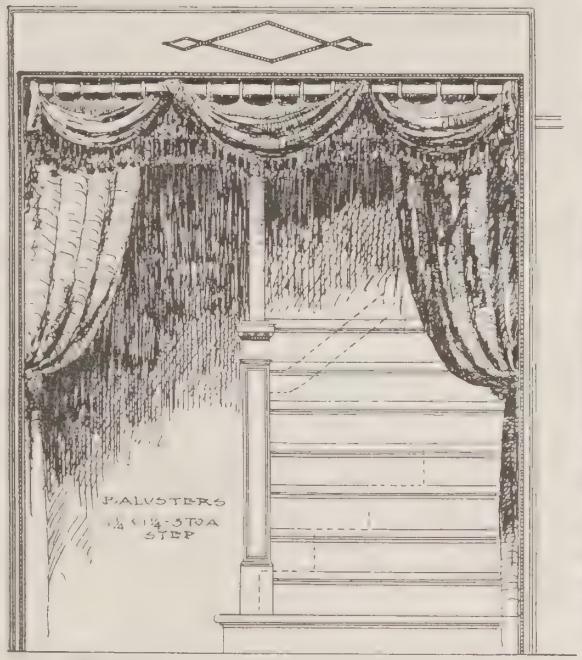
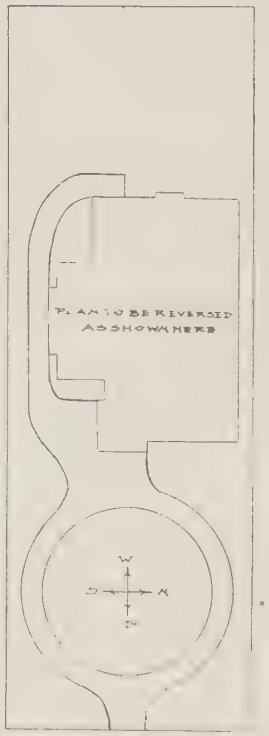
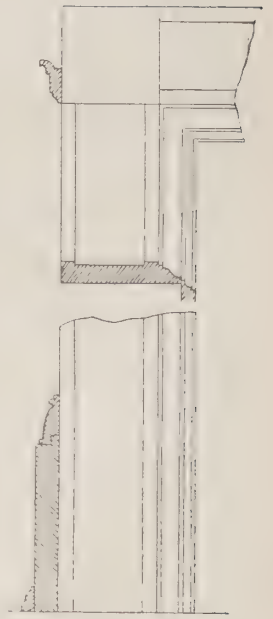


-FRONT-VIEW OF STAIR-
SCALE 3/4 = TO 1'-

PERSPECTIVE VIEW



-1ST-PLAN-
-SCALE 1/8" = 1'0"-



-CASING-&-BASE-
-SCALE 3" = 1'-0"-

BRICKBUILDER COMPETITION FOR A $2,000 BRICK HOUSE.

DESIGN BY JULIUS E. HEIMERL, MILWAUKEE, WIS.

FRONT ELEVATION

SIDE ELEVATION

REAR ELEVATION

SECTION

SCALE 3/16" TO 1'

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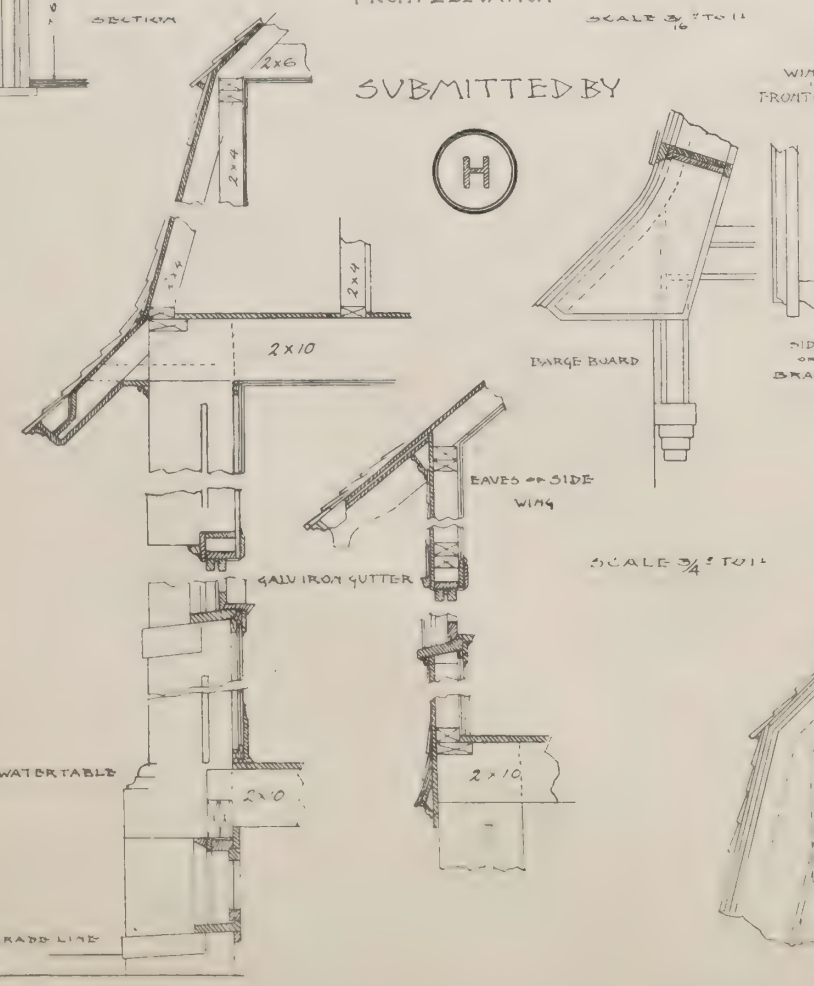
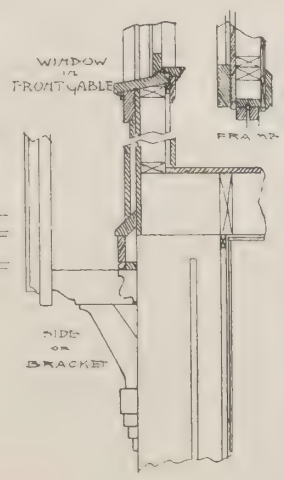
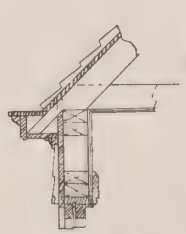
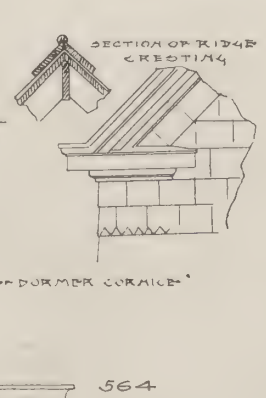




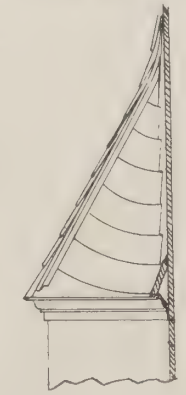
SCALE 3/4" TO 1'

PORCH BRICK COLUMN


DETAIL OF DORMER CORNICE



SET OFF OF SIDE CHIMNEY


FLAN OF REAR CHIMNEY

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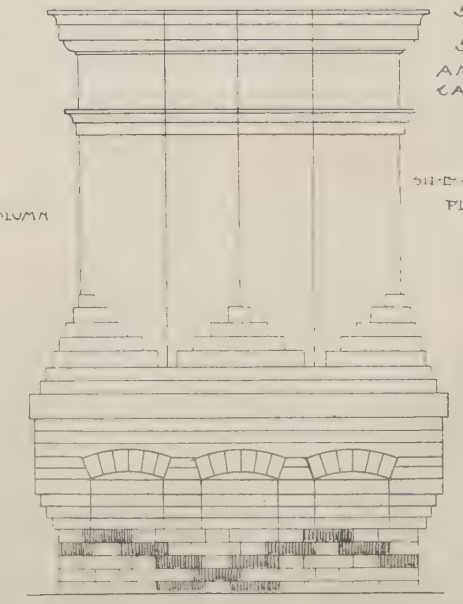
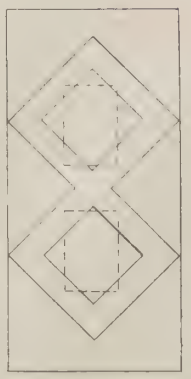
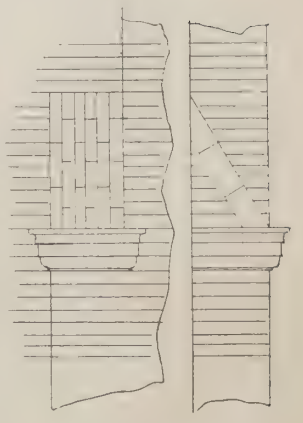
555
ANDERSON CATALOGUE



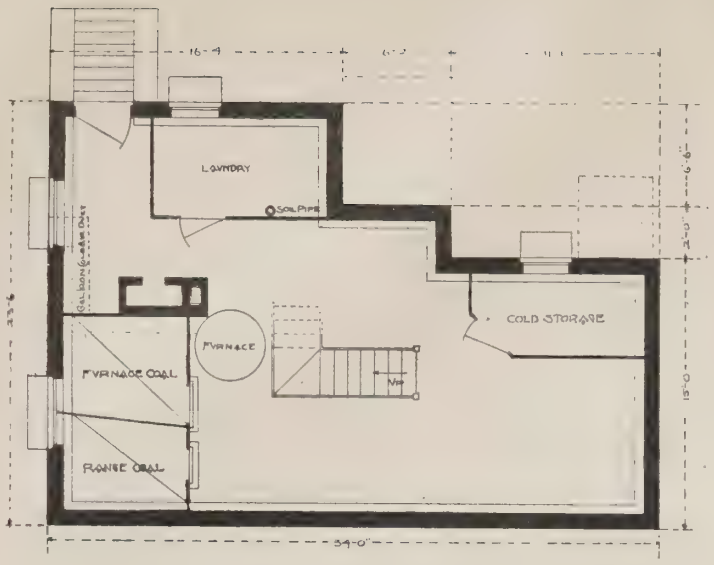
SIDE CHIMNEY PLAN


PLAN


SET OFF OF REAR CHIMNEY

BRICKBUILDER COMPETITION FOR A $2,000 BRICK HOUSE.

DESIGN BY JULIUS F. HEIMERL, MILWAUKEE, WIS.



BASEMENT PLAN

FIRST FLOOR PLAN

SECOND FLOOR PLAN

"BRICKBUILDER" COMPETITION FOR A 2000 DOLLAR BRICK HOUSE

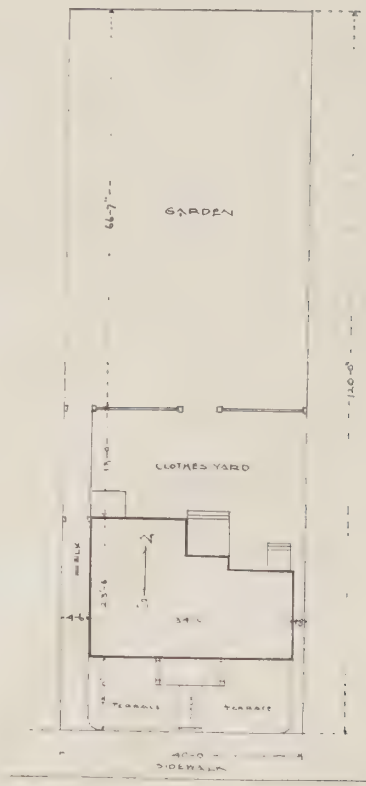
SUBMITTED BY "N Y P A S"

Scale— 1 2 3 4 5 6 7 8 9 10 FEET

NORTH [REAR] ELEVATION

SOUTH [FRONT] ELEVATION

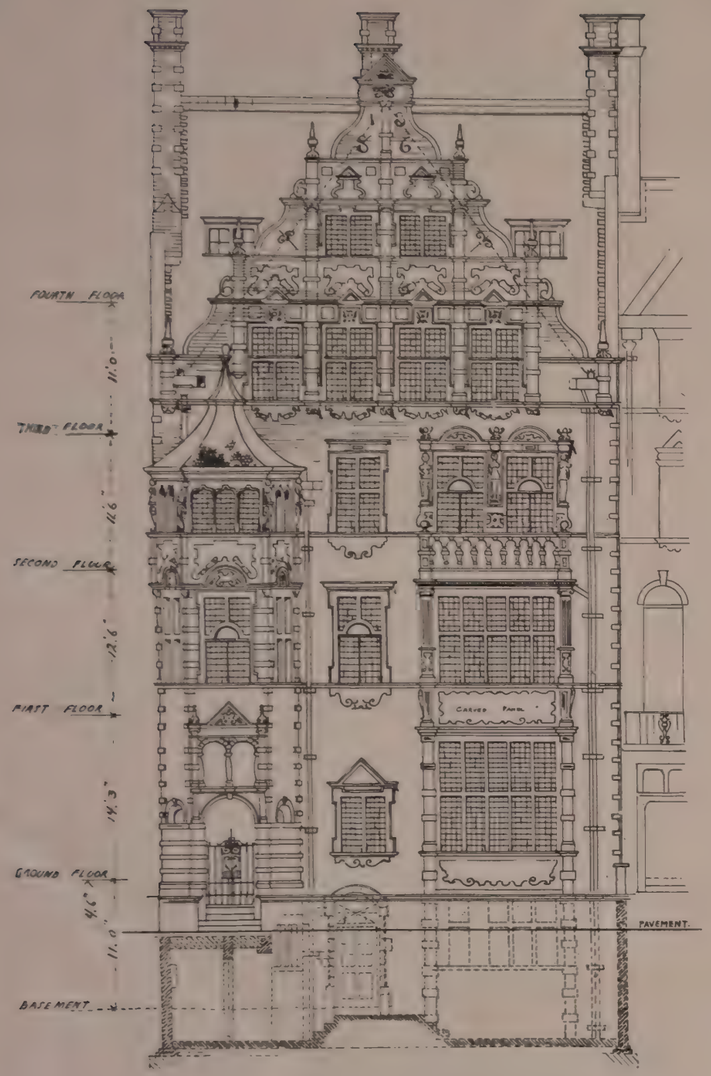
SECTION



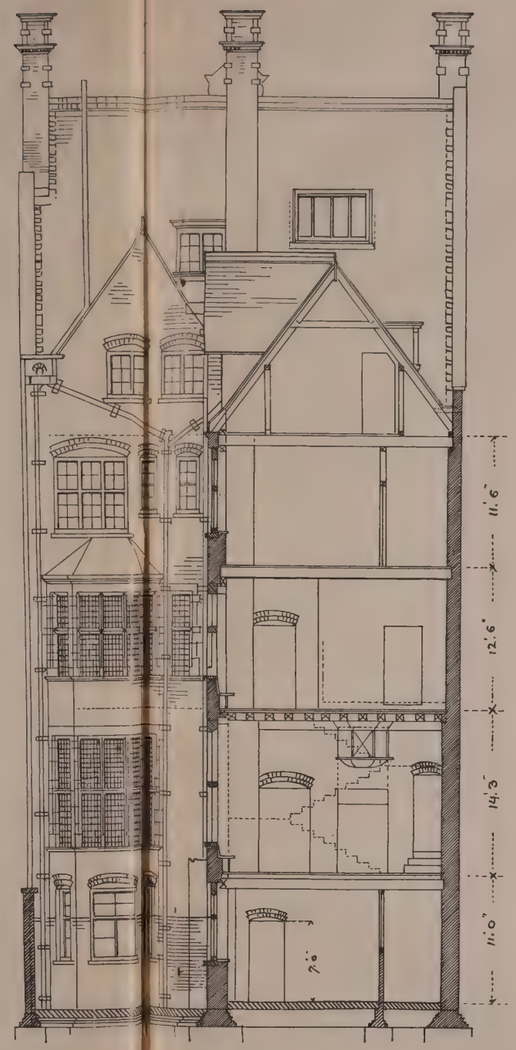
BLOCK PLAN Scale— FEET

BRICKBUILDER COMPETITION FOR A $2,000 BRICK HOUSE.

DESIGN BY W. T. S. HOYT, BOSTON, MASS.

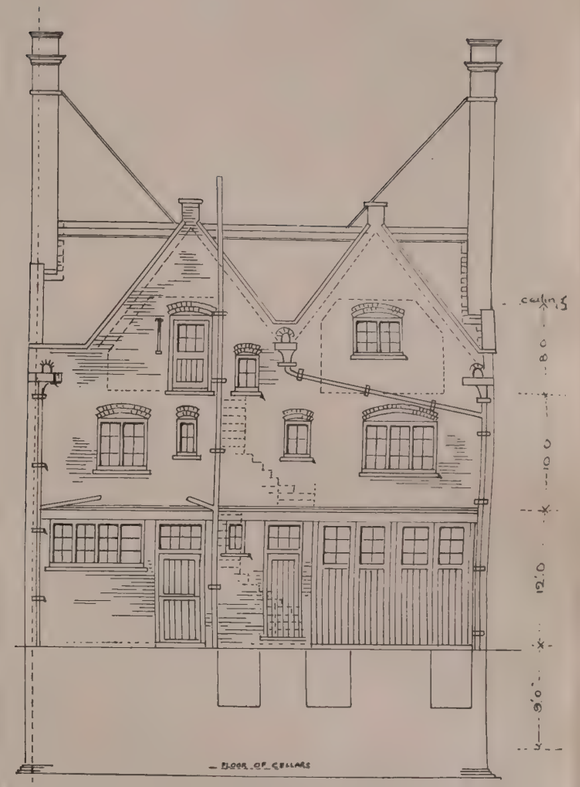


FRONT ELEVATION.



SECTION & ELEVATION

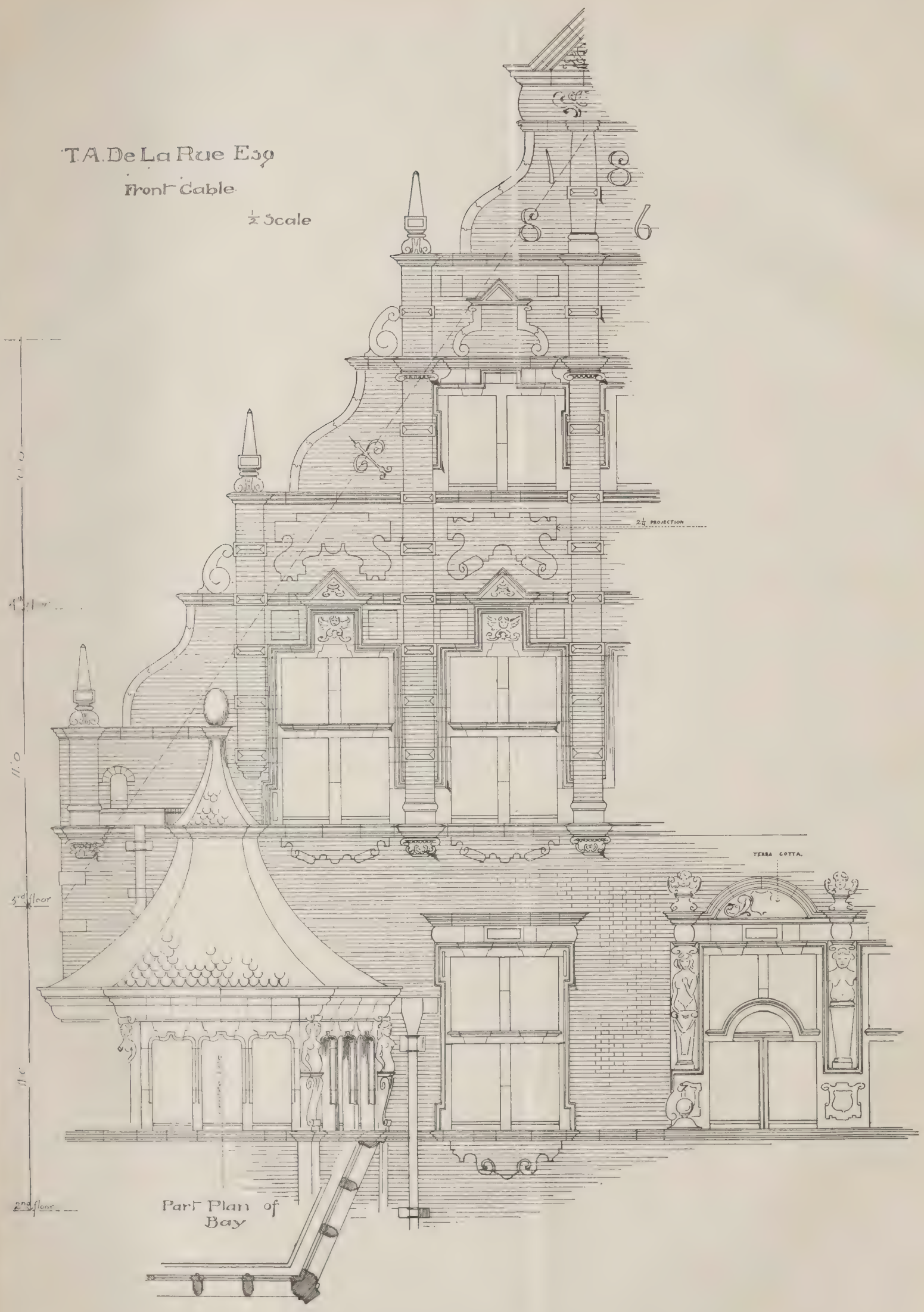
T.A. DE LA-RUE ESQ.
CADOGAN SQUARE.



BACK ELEVATION OF STABLE.

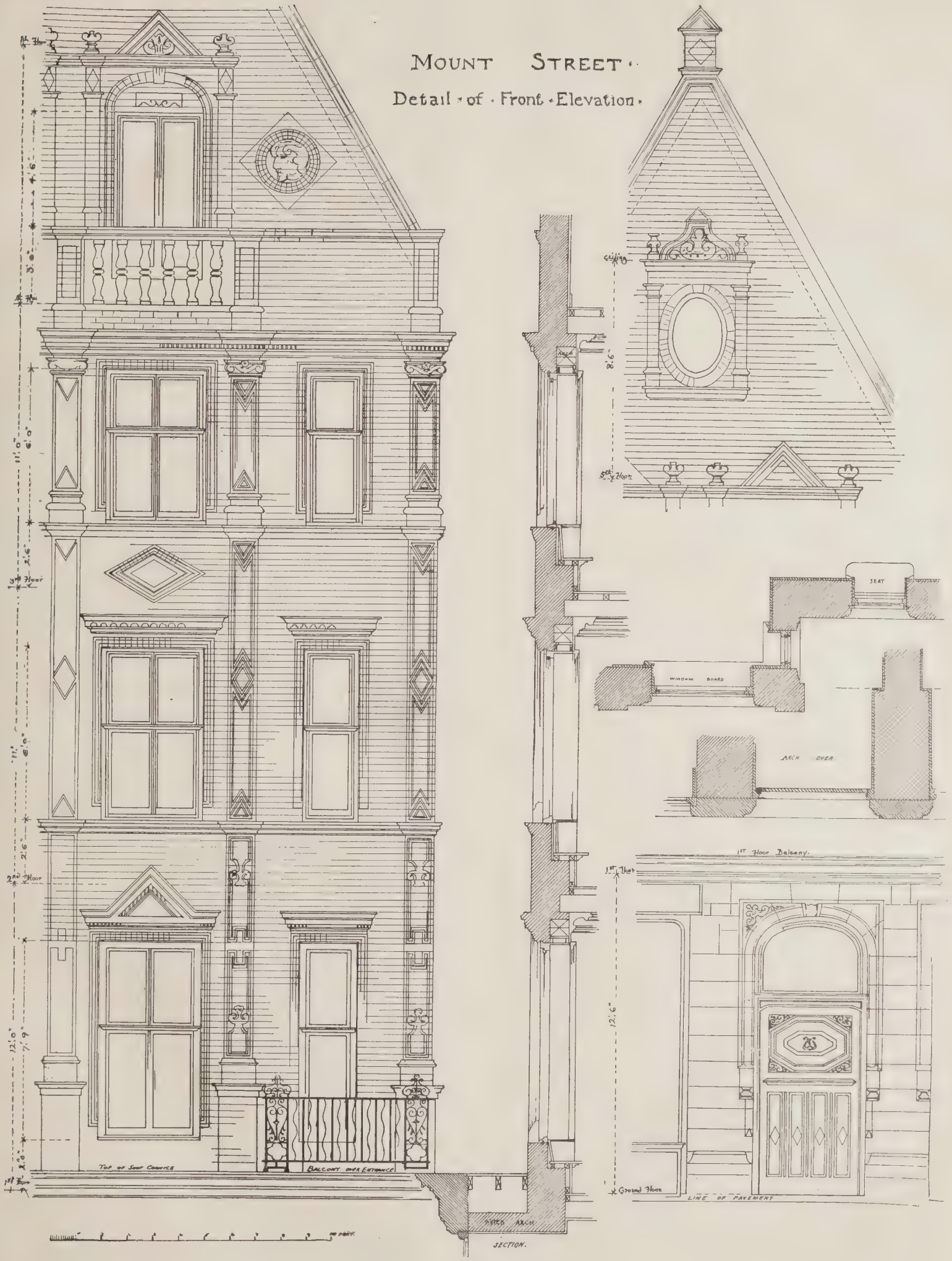
RESIDENCE IN CADOGAN SQUARE, LONDON. For details see Plate 6.

ERNEST G[illegible] ARCHITECTS, LONDON, ENG.



DETAIL OF RESIDENCE, CADOGAN SQUARE, LONDON. See Plates 4 and 5.

ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.



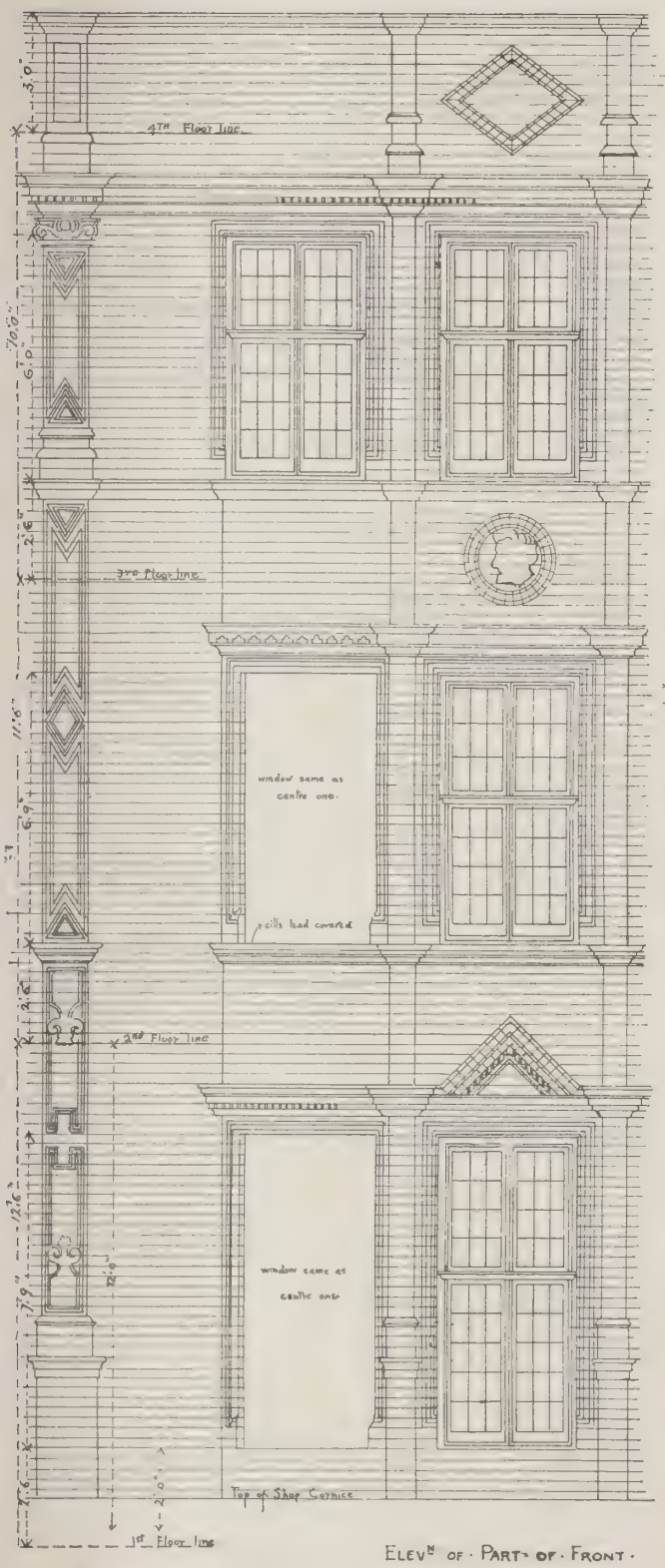
DETAILS OF ENGLISH BRICKWORK.

ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

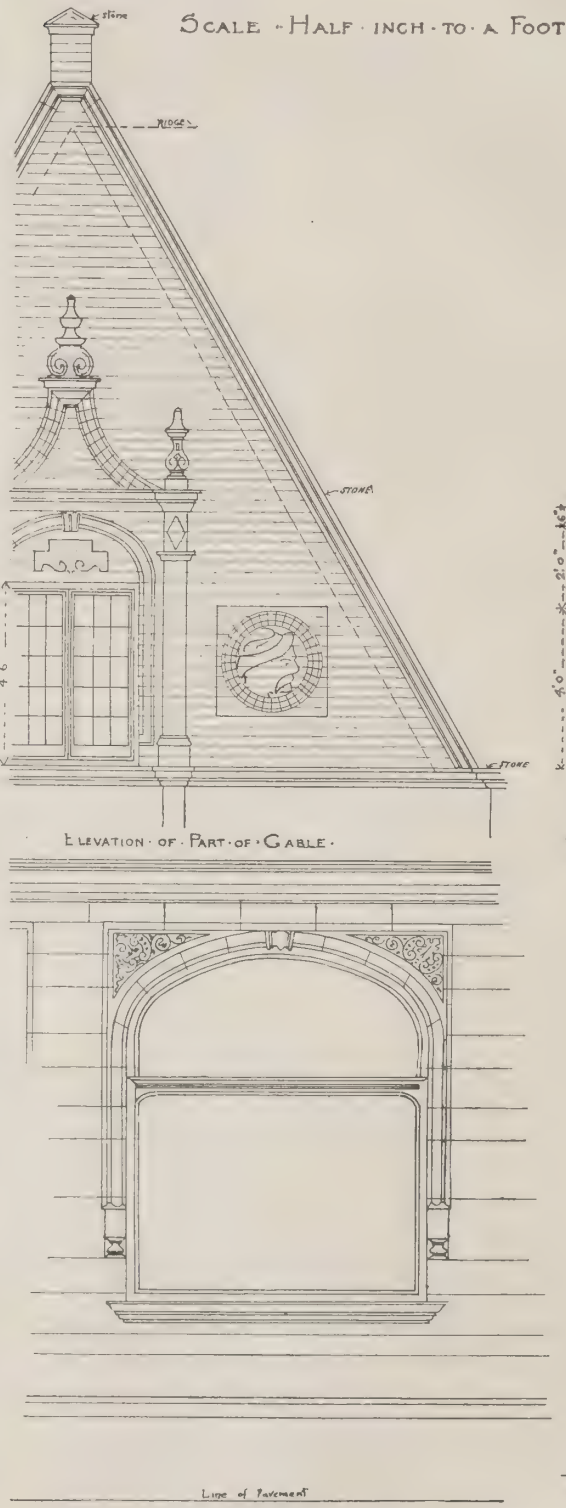
·MOUNT · STREET·

DETAIL · OF · FRONT · ELEV^N. MESS^RS. RUTTER · & · WAGHORN.

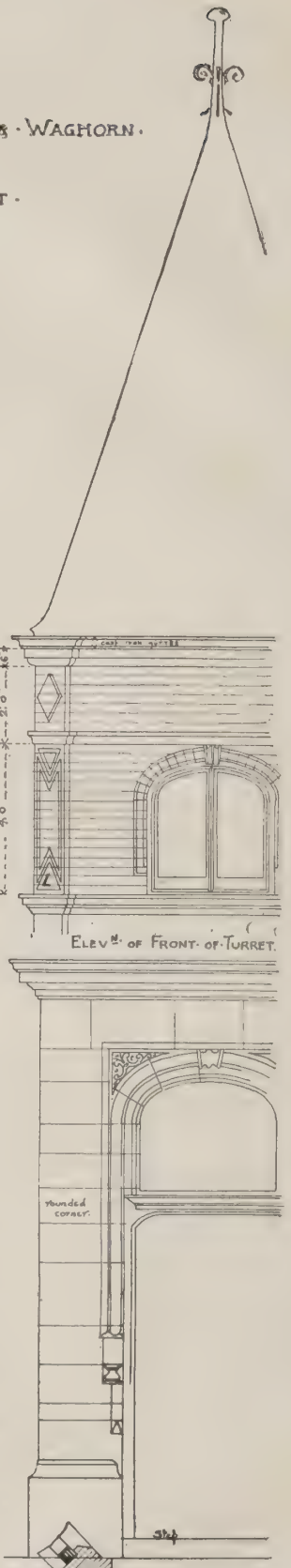
SCALE · HALF · INCH · TO · A FOOT ·



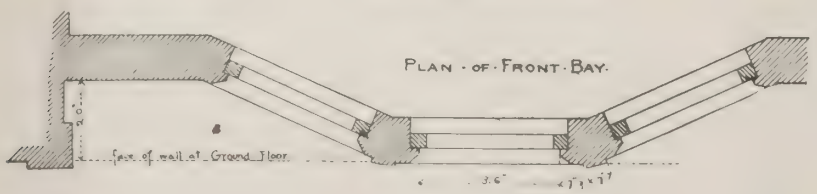
ELEV^N OF · PART · OF · FRONT ·



ELEVATION · OF · PART · OF · GABLE ·



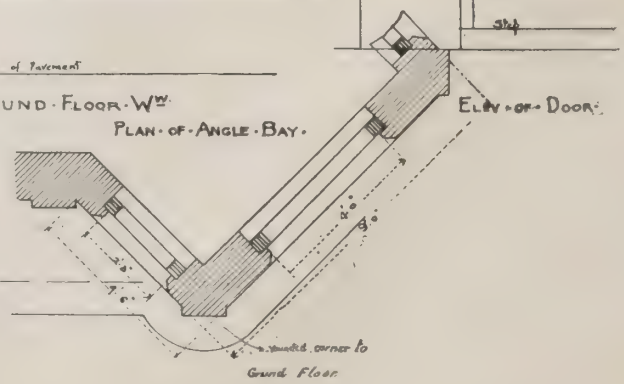
ELEV^N OF · FRONT · OF · TURRET.



PLAN · OF · FRONT · BAY.

Line of Pavement

GROUND · FLOOR · W^M.



PLAN · OF · ANGLE · BAY ·

ELEV · OF · DOOR.

DETAILS OF ENGLISH BRICKWORK.

ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF BRICK AND TERRA-COTTA ARCHITECTURE.

PUBLISHED BY

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THE BRICKBUILDER is for sale by all Newsdealers in the United States and Canada. Trade supplied by the American News Co. and its branches.

IN looking back upon the year just closed THE BRICKBUILDER takes satisfaction in noting that many of the reforms in brickbuilding which it has urged, and labored as far as lay in its power to help forward, have made a distinct advance. It can hardly be denied that more improvement has been made in this year than in any single previous year, and we feel confident that the forward movement will continue with accelerated speed. Many causes have conduced to this end. In the first place, many of our foremost architects who had hitherto given but slight attention to brickwork, have devoted especial study to it, and many who had often given evidence of their knowledge of what a good brick design requires, have given more attention to it than ever before. Brickmaking also has advanced, and architects have become more familiar with what the best brickmakers are accomplishing. The new building laws in several cities have emphasized afresh the importance of brick in its fire-resisting qualities, and have thus helped to increase the recognition of it as one of the noblest of building materials. This has led owners to be more willing to use it in place of stone, a willingness which has at once given the architects the opportunity to show what can be done in brick, and which has also been increased by the excellent use which in so many cases has been made of these opportunities. The improvement is, of course, for the most part, due to those architects who have given more attention to brickwork and urged its merits upon their clients and their fellow architects, and there are among the younger men especially a number who have shown themselves capable of a much more interesting and much more appropriate treatment of brick than it has ever received in this country until very recently. THE BRICKBUILDER has endeavored to help on this movement by pointing out, and, when possible, by publishing, the more interesting of these new brick buildings, together with the best work being done abroad, and examples of the ancient brickwork of Europe from which our designers draw much of their inspiration. In this way, through its columns, designers interested in brickwork in different parts of the country are kept informed of what is being done by others, and thus may be encouraged and helped in their own work.

IT is noticeable that during the year the use of the better bonds — English bond and Flemish bond — has been more common in the best work, to say nothing of the lavish use that has been made in some instances of the more complicated bonds in ornamental work. We are, of course, a long way yet from any frequent use of English or Flemish bond in every course in purely constructional work: it might be said, indeed, that these bonds are never used except in façade walls. But if our brickwork is to become what it ought, the abominable "American" bond must be abandoned, or, at any rate, restricted in its use to the cheaper and commoner constructions, except in cases where it may be made of value decoratively where constructional considerations are not paramount. Such cases are, however, very exceptional; and the use of the bond ought to be regarded as a sign of cheap and generally poor work. In addition to the wonderful variety of expensive bricks of ornamental color, the past year has shown more appreciation of the beauty of variety of color in common brickwork also; and there have been several instances which have come under our notice in which common brick has been used with telling effect for the sake of its variety of color, just as the yellow brick, which takes its name from the Madison Square Garden, where it was first used, is especially esteemed for its beautiful variety of color, for there is other yellow brick of which one sees only too much. To see the relative effect of the two, we have but to compare the walls of the Madison Square Garden itself, or any building in which this brick has been used (for we are now speaking merely of the effect of the brick in producing an agreeable wall surface without regard to the design of the building in which it may happen to be used) — we have but to compare, we repeat, the exquisite beauty of the wall surface of the Madison Square Garden, in which every brick differs in color from its neighbors, with, for instance, the wall surface of the yellow brick walls of the addition to the State House of Boston, now in course of construction, where the absolute monotony of color of the brick ruins the effect of the building.

IN addition to the points we have already adverted to, we ought, perhaps, also to draw attention to the recognition of the joints of brickwork as a means of effect, and also of the textures of different bricks when contrasted with each other. Both these sources of effect have received much more attention during the past year than formerly, and brick diapers produced by different bonds and using brick of different colors have come much more into use. In

England and France in the modern as well as in the old work these sources of effect are well understood.

On the other hand, it is refreshing to note that the monstrous wall of carefully culled red pressed brick is coming more and more into well-deserved contempt, especially among the best architects. We suppose it will take a long time for New York, as well as for some Western cities, to wean itself from the use of the vermilion paint pot. But this too will come in time. It is curious to note that in architecture, as well as in politics, while many of the best reforms emanate from New York, some of the worst abuses seem to find their last refuge there.

THE better design of brick buildings which, as we have noted, is so marked at present, will require greater intelligence on the part of the contractors and of the brick masons. A beautiful design, to be carried out to best advantage, must receive some meed of appreciation from the men who are to put it into execution, and the best contractors and the best bricklayers will strive to familiarize themselves with the requirements of good brickwork, and of the methods of practical work which the best brick design demands. It should be more and more recognized that a closer sympathy and closer union of designer and workman, of architect and builder, are required by the best work. And we think the day is not far distant when the builder will receive as thorough a theoretical as well as practical training for his work, as it is now recognized the architect must have for his. From the workman, also, greater intelligence, greater knowledge, and greater interest will be demanded. The mere laying of a plain brick wall requires comparatively little intelligence, so that it has been notorious that bricklayers are not, as a class, as intelligent or as much interested in their work as the carpenters. The action of some of the unions, with their tendency to level everything down to the lowest, instead of raising up, has still further reduced the standard of intelligence among the bricklayers, as it has also reduced their ability for rapid and efficient work. But the requirements of the better brick design which is now coming into vogue, the use of brickwork as a means for obtaining the most elaborate architectural effects, absolutely necessitate greater skill, greater intelligence, and greater interest in his work on the part of the workman, and must soon bring to the front a class of men not inferior to the best carpenters in intelligence, skill, and sympathy with what is good in their work. The training of workmen is becoming daily a matter of more and more importance, and in this regard the trade schools and manual training schools, such as the Mechanic Arts High School in Boston, are doing an excellent and much-needed work.

AMONG the architects who have of late made excellent use of brick, none perhaps have produced — few indeed have had the opportunity of producing — such an interesting series of designs, interesting especially in the use of the simple forms of brickwork, as have come from the office of the city architect of Boston. It is to be hoped his work will have wide influence on the brickwork of the country. The *Architectural Review*, in its last issue, publishes several exceedingly interesting examples of Mr. Wheelwright's work; especially to be noted is the charmingly simple Engine House at Ashmont. The same number of the *Review* contains details and a full-page photo plate of the Century Club House in New York by McKim, Mead & White, which we have had occasion to refer to so frequently, and which is an excellent example of the use of terra-cotta with brick, and of the delicacy of effect to which light terra-cotta and yellow brick lend themselves.

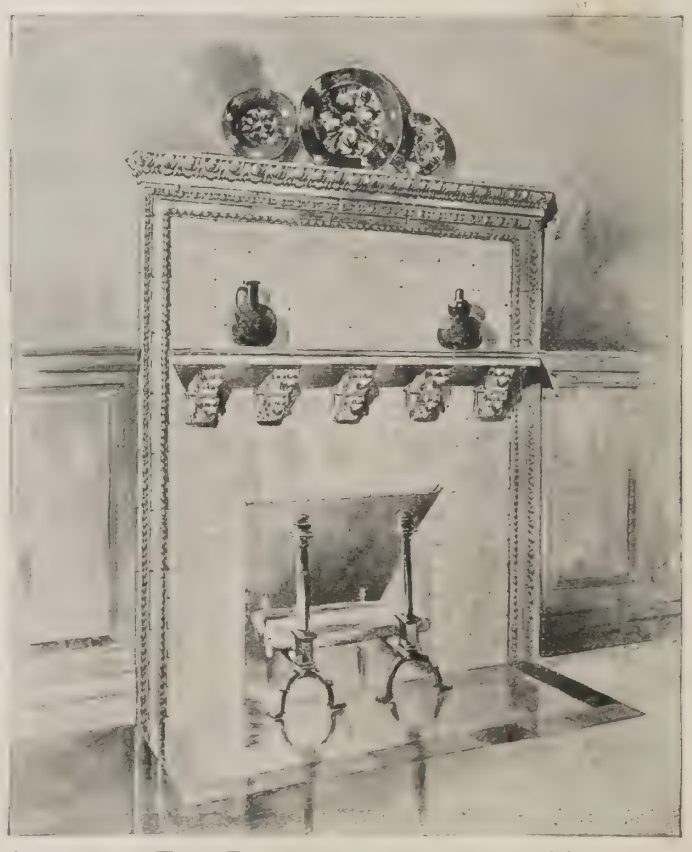
COMPETITIONS.

RULES: All drawings must be sent in marked with some motto or device and accompanied by a sealed envelope marked with the same, containing the full address of the competitor. The designs are judged by a committee of well-known architects, solely upon their merits, the names of the designers remaining unknown until the award is made, when the sealed envelopes corresponding to the devices on the designs are opened. To protect the interests of our advertising patrons it is stipulated that no ornamental bricks not found in their catalogues shall be used. This is really no restriction, for practically all of the leading manufacturers will be found represented in THE BRICKBUILDER. To encourage the study of effective use of the commoner materials, of two designs equally good, preference will be given that showing a skilful use of ordinary bricks to secure ornamental effect.

COMPETITION NO. 10.

A FAIENCE MANTEL.

Messrs. Atwood & Grueby, associated with Fiske, Homes & Co., of Boston, manufacturers of Faience ware for architectural decoration, desire to offer through the columns of THE BRICKBUILDER a competition for a Faience mantel, and to give an idea of what this work



is, we publish herewith a sketch by J. A. Schweinfurth, showing its character.

Faience is really terra-cotta, treated with enamels and glazes in any colors desired, so that any terra-cotta treatment is appropriate. The mantel illustrated above can be executed for about $60, and designers are requested to keep as near this cost as possible. Plan and front and side elevations at one half inch scale are required, and the designer may, if he desires, submit, in further explanation of his design, a perspective sketch in color or monochrome, at a smaller scale.

For the best four designs, Messrs. Atwood & Grueby will pay $10 each, and for the next four or less that are considered worthy a prize, THE BRICKBUILDER will award $5 each. Drawings must be received, prepaid, at THE BRICKBUILDER office on or before March 13, 1893.

COMPETITION NO. 7.

DESIGN FOR A $2,000 BRICK HOUSE BY *H. in CIRCLE.*
JULIUS HEIMERL, MILWAUKEE.

PLATES 1 AND 2.

NOTES FOR SPECIFICATIONS.

Make excavation for entire basement as per section, also for all piers, etc.

FLOOR.

Matched fencing floor in entire basement on 3 x 4″ sleepers bedded in ashes and cinders.

FOOTING STONES.

Footing stones to be about 2 ft. square by 6″ thick, also footing stones under basement posts.

BRICK WALLS.

Basement brick walls 18″ hollow with 9″ and 4″ walls and 5″ air spaces. First story wall 14″ hollow with 1″ air space, hollow walls well bonded together. All brick good common hard burnt brick; all facing brick to be common yellowish, pink common brick slightly varying in tone, and all laid in good lime mortar.

Diaper pattern on side chimney to consist of common brick, cream colored brick laid with Flemish bond.

The facing brick alluded to above are manufactured in Racine, Wis. Their charm consists in having a peculiar pink color varying in tone enough to break the monotony of a plain wall, and combine excellently in treatment with common cream colored brick. Their price is that of common brick and are in all respects the equal of them as to quality and endurance.

PLASTERING.

Lath and plaster the entire first and second stories two coats, namely a brown coat and hard white finish coat.

Front gable to be plastered two good heavy coats put on wire netting, rendering plaster impervious to water.

Plastering in front gable, also all copings where mortar joints are directly exposed to the weather to be washed down in this manner, namely: The process consists of two coats, one composed of castile soap and water boiling hot, and one of alum and water with a temperature from 60° to 70° Fahr.

The proportions are three fourths of a pound of soap to one gallon of water, and half a pound of alum to four gallons of water, both substances to be perfectly dissolved in water before being used.

Walls should be perfectly clean and dry, and the temperature of the air not above 50° Fahr. when compositions are applied. These washes to be applied alternately until walls or plastering are made impervious to water.

SILLS.

All windows to have sandstone sills harmonizing with color of brick.

Door sills and porch steps to be best limestone.

LUMBER.

All lumber used to be second clear pine, well seasoned. That on interior in first and second stories to be kiln dried. Sill plates to be as per section and scale drawings. Those for interior partitions 2 x 4 or 2 x 6 as studding may happen to be.

BRIDGING.

Joint over 9 feet long to have 1 x 3″ cross bridging.

DIMENSION OF JOIST.

First floor joist 2 x 10 — 16″ on centre. Second floor joist 2 x 10 — 16″ on centre. Second story ceiling joist 2 x 6 — 16″ on centre. Do all necessary double trimming.

STUDDING.

All studdings 2 x 4 corner solid, door and window studs double.

FURRING STRIPS.

Furring strips 1 x 2″ — 16″ on centre on all brick walls in first and second stories.

LINTELS, CENTRES, ETC.

Furnish wood lintels, centres of arches and cradles when required.

GROUNDS.

Furnish ⅞ x 2″ grounds for all casings and bases and wainscots; make all wall plates as per scale drawings.

ROOFS.

Rafters 2 x 4 — 16″ on centres, sheathing to be of common boards with close joints; shingles 4½″ face to the weather best (Star A Star), same on side of building.

SHEATHING.

All sheathing on outside studding to be common boards.

PAPER.

Cover all outside sheathing roofs and side, etc., with one thickness of Star building paper.

SCUTTLE.

Provide scuttle into garret from second story hall, also one on to roof.

FLOORS.

All floor in first and second stories to be made of No. 1 matched and planed fencing except in kitchen.

Kitchen and bath-room are to have a good 2½ x ⅞″ hard white maple floor.

WINDOW FRAMES.

All window frames to be box frames for sliding each as per scale drawings.

SASH.

All sash to be $1\frac{3}{8}$ sliding sash except those in one light, which are to swing.

DOOR FRAMES.

Outside door frames $1\frac{3}{4}''$ moulded same as window frames. Inside door frames $1\frac{1}{8}''$ thick.

DOORS.

First story doors $1\frac{3}{4}''$ thick, second story $1\frac{3}{8}''$. O. G. four panelled doors.

Outside door $2\frac{1}{4}''$ thick moulded panels as per elevations.

BUTTS.

All butts to be black Japanese silver tipped $3\frac{1}{2} \times 3\frac{1}{2}''$.

WAINSCOTING.

Kitchen wainscoted 3 feet 6″ high; bath-room 5 feet high with $2\frac{1}{2} \times \frac{7}{8}$ matched and beaded ceiling with base and top mould.

MAIN STAIRS.

Newels, balusters, hand rails, and treads to be of red oak with cove balance of pine: see scale drawings.

BASEMENT STAIRS.

Treads to be of maple $1\frac{1}{8}''$ thick, balance of stairs to be of pine.

PANTRIES AND CHINA CLOSET.

Pantry and china closet to have a table shelf 3 feet above floor with drawers and dwarf doors below. Also

BRICKBUILDER COMPETITION FOR A $2.000 BRICK HOUSE. DESIGN BY W. T. S. HOYT, BOSTON.

TRIMMINGS.

Knobs and trimmings for outside door to be bronze, for interior doors hemacite. All locks to be good mortise locks.

SASH PULLS.

Sash pulls for all windows.

SLIDING DOOR.

Door to slide into pocket lined with sheathing and hung with Souler's patent hanger.

INSIDE FINISH.

All inside finish second clear, thoroughly dried and seasoned, for painting casings, bases, etc., to be moulded as per scale drawings.

Provide plain seats near fireplace finishing with balance of finish with neatly moulded seat top, also neat corner beads on all plaster corners.

five shelves above those in china closet enclosed with swinging sash doors.

PARTITIONS IN BASEMENT.

Partitions to be of upright matched and planed fencing with $2 \times 4''$ top, and bottom pieces also put in frames of same stuff for door openings.

COAL BIN.

Make coal bins of 2″ plank with $4 \times 4''$ corner posts, one section to be removable.

TIN WORK.

All flashing of best 1x tin, also gutter of main roof. Gutters of side wing of No. 26 galvanized iron, also conductors Austin patent corrugated.

PAINTING AND GLAZING.

All exterior woodwork painted three coats as directed.

Interior woodwork two coats and grained in imitation of different woods.

All glass to be single thick American; that in front dining-room window leaded glass.

All shingles to be dipped, and given another coat when on building of Cabot's creosote stain of tints directed.

DESIGN FOR A $2,000 BRICK HOUSE. BY "N'Y PAS."

W. T. S. HOYT, BOSTON.

PLATE 3.

Materials to be of a quality consistent with good workmanship and low cost. Stone wall, 6′ 4″ high, 1′ 6″ thick; mortar, equal parts cement and lime, sand, five parts. Brick walls 12″ thick to water table, 8″ above. Work laid in Flemish bond, bricks selected for color of headers and stretchers. Mortar to be one half part cement, one part lime, five parts sand. Straight arches selected common red brick. Water table, Hydraulic-Press Brick Co. No. 11. Chimney above roof selected brick caps of terra-cotta. Window sills of brick with cement wash. Stone sills for doors only. Brick walls, and plaster all walls two coats, first coat best lime, clean sharp sand, long hair, second coat lime putty. Timber of spruce, joists 2″ x 10″, 2″ x 10″, 2 x 8″, 16″ on centres. Rafters 2″ x 4, 20″ on centres, roof and dormers shingled except rear deck tinned. Sub-floors and attic spruce. Finished floors first and second stories, porch floors and steps, and treads and risers of stairs to be hard pine. All of the finished woodwork, including doors, to be cypress. Kitchen and bath-room wainscoted 3′ 6″ high, chimney breast of selected red brick, hearth of unglazed tile, stock mantle of cypress, cost ten dollars. In general and where possible the finish is to be of selected stock patterns of mouldings, etc., of which it is possible to secure neat and tasty designs at very cheap prices. First and second stories glazed with second quality German, basement sashes glazed with third quality German. All exterior hard wood floors and steps, and all interior woodwork, treated with two coats of boiled linseed oil. Exterior woodwork primed, and except floors, to be painted three coats oil and lead paint, in pure white tints except blinds, which are to be green, shingles are to weather. All hardware to be dark bronze finish, cheap and neat fixtures, such as sink drip cupboards, etc., for kitchen and pantry included in this specification, but no furniture as range, ice chest, sideboard, etc. Conductors to be connected with soil pipe by galvanized iron pipes. This specification does not include grading and exterior accessories.

Note. A careful estimate of this design places its cost, exclusive of plumbing, heating, and grading, within the limit of $2,000.

There are few men better known at the Patent Office than Mr. J. C. Anderson, of Anderson Brick fame. At a recent meeting of the American Association of Inventors and Manufacturers, at Washington, Mr. Anderson was elected Vice-President for 1893.

BOOKS AND PAPERS.

THE December *Clay-Worker* is as interesting and useful as ever. It is certainly a most admirably edited journal, and covers its field so thoroughly, there scarce seems need of any other periodical devoted to the technical side of brickmaking. There is little to interest the architect or builder in this particular number. A half-tone of a brick building in Louisville, which, architecturally is fair, but far below the average of subjects, *The Clay-Worker* has formerly published. The paper, as usual, is well illustrated with half-tones from photographs — portraits of brickmakers, views in yards and factories, etc.

Under the head of "Correspondence" a lot of senseless twaddle against "book larning," probably contributed by a *practical man* — he signs himself "The Village Brickmaker" — has by mistake found its way into type, instead of the basket under the editor's table, where it most certainly belongs.

PATENTS.

A MONTHLY LIST OF RECENT PATENTS GRANTED, WHICH CONCERN THE CLAY-WORKING AND THE BUILDING INDUSTRY, REPORTED SPECIALLY FOR THE "BRICKBUILDER," BY H. M. STERLING, ATTORNEY AT LAW, WASHINGTON, D. C.

BRICKKILN. Charles B. Coxe, Brooklyn, N. Y., inventor and assignor to Edward B. Esterbrook of same place. No. of patent 486,557. Date of issue Nov. 22, 1892.

BRICKKILN. Louis H. Reppell, Kansas City, Mo. No. of patent 487,158. Date of issue Nov. 29, 1892.

BRICKKILN. Joseph Conley and James M. Wolfe, Tarkio, Mo. No. of patent 487,174. Date of issue Nov. 29, 1892.

CONTINUOUS BRICKKILN. Carl F. Kaul, Madison, Neb. No. of patent 486,972. Date of issue Nov. 29, 1892.

BURNING CLAY TO MAKE BALLAST. Henry G. Butler and William Butler, Kenosha, Wis., assignors to the Davy Clay Ballast Co., same place. No. of patent 486,781. Date of issue Nov. 29, 1892.

BRICK DRYER CAR. Nathan Harper, Newark, N. J. No. of patent 486,931. Date of issue Nov. 29, 1892.

BRICK MACHINE. Robert N. Ross and Henry H Kelher, St. Louis, Mo., assignors of one half to Minard S. Bowman same place. No of patent 487,161. Date of issue Nov. 29, 1892.

BRICK MACHINE. Sylvester P. Babcock, Adrian, Mich. No. of patent 488,106. Issued Dec. 13, 1892.

BRICK PRESS. George H. Babcock, Plainfield, N. J. No. of patent 488,049. Issued Dec. 13, 1892.

PAVING BRICK. Leslie C. Turley, Portsmouth, Ohio. No. of patent 487,652. Date of issue Dec. 6, 1892.

BRICK TRUCK. C. H. Horton, Wellington, Ohio. No. of patent 487,835. Date of issue Dec. 13, 1892.

BRICK OR TILE CUTTER. A. Z. Williams, Chicago, Ohio. No. of patent 488,343. Issued Dec. 20, 1892. Patent contains sixteen claims.

CEMENT, ARTIFICIAL PORTLAND. Carl Forell, inventor, Brunswick, Germany. No. of patent 486,706. Date of issue Nov. 22, 1892.

CEMENT, ARTIFICIAL ROMAN. Carl von Forell, inventor, Brunswick, Germany. No. of patent 486,707. Date of issue Nov. 22, 1892.

ROOF OR WALL COVERINGS. Marx P. Schetzel, San Francisco, Cal. No. of patent 487,585. Issued Dec. 6, 1892.

ART OF CROWNING FLOOR JOISTS AND APPARATUS THEREFOR. Joseph Friedrichs, St. Louis, Mo. No. of patent 487,406. Issued Dec. 6, 1892.

FIREPROOF CEILING. George Hayes, New York, N. Y. No. of patent 486,982. Date of issue Nov. 29, 1892.

SHEET METAL ROOF. Louis H. Britton, New Lisbon, Ohio, assignor of one half to Jacob B. Warner, same place. No. of patent 487,172. Issued Nov. 29, 1892.

WALL COVERING. COMPOSITION. La Roy F. Griffin, North Granville, N. Y. No. of patent 486,870. Date of issue Nov. 29, 1892.

OUR INCREASE IN ADVERTISEMENTS.

WHEN THE BRICKBUILDER was started a year ago, it was decided to limit the advertising space, for one year at least, to the three cover pages. One reason for this was a desire to distinguish our paper from the many periodicals devoted to architecture and building, whose only excuse for publication is the advertising revenue they bring their owners. Such papers have a merely nominal circulation in most instances, and by circulation, we mean distribution among actual subscribers or purchasers. They depend upon the cleverness of their advertising solicitors ; this gone, utter failure is the result.

It seems to us that the only substantial basis for advertising is a well-established paid circulation. To secure this has been our first effort, and our success well repays us for any loss of revenue from increased advertising space.

We do not consider advertising a necessary evil, borne with in order to allow of a lower subscription price; and we have no patience with those mistaken minded members of the architectural profession who look at the advertising pages of their periodicals as useless, burdensome material, to be torn off without a second thought and consigned to the waste basket. These men are always behind the times, opinionated to the last degree, and lacking that knowledge of improvements in building materials and appliances which they owe to their clients. They do not realize that through the advertising columns of the professional journals there is set forth the record up to date of the inventions and discoveries that are enabling us to build better, more quickly, more cheaply. The manufacturer, introducing a new form of building material, or some patented appliance, seeks to reach the architects through what seems to him the most natural, the most legitimate channels, — the advertising columns of the architectural press.

To the majority of American architects, we believe, these advertisements are of constant practical value, and every paper reaching a large class of professional or trade readers is in duty bound to make its advertising pages as complete as possible in the particular field it covers.

A year ago we had no subscribers and there was some question as to our getting any. We decided to first secure these in quantity sufficient to carry the paper, if need be. We are tolerably well satisfied now, and shall give some attention to the development of our advertising department. This will of course take time, but we feel certain of ultimate success. We urge our readers not to overlook this portion of THE BRICKBUILDER, and we want to impress upon them the fact that every advertiser likes some tangible result from his advertising investments. Therefore it is of prime importance when writing in answer to an advertisement to mention the paper in justice to both advertiser and publisher — to the former, because of his desire to ascertain which mediums pay, and which do not; to the latter, because it insures to his paper credit for its effective work. We submit with this number our first increase in advertising matter, and we trust every subsequent issue will witness a steady growth in this department.

THE ILLUSTRATIONS.

Plates 1 and 2. BRICKBUILDER competition for a $2,000 brick house. Design by Julius Heimerl, Milwaukee, Wis.

Plate 3. Design by W. T. S. Hoyt, Boston, Mass. These are both very suggestive designs for a small brick house of very different types. That the exceeding simplicity of Mr. Hoyt's design is not without its charm is clear from the perspective which we print on page 8. Mr. Heimerl's perspective suggests a somewhat better design than his elevations show. The broader proportions of the gables shown in the sketch are much more agreeable than those shown in the working drawings.

Plates 4 and 5. Residence in Cadogan Square, London, England, for T. A. De La Rue. Ernest George & Peto, architects.

Plate 6. Details of house in Cadogan Square. Ernest George & Peto, architects.

Plates 7 and 8. Details of business premises on Mount Street, London, England. Ernest George & Peto, architects.

We continue in this number further illustrations of the very interesting brick and terra-cotta work of Ernest George & Peto, which is characteristic of the best work in this kind now being done in England. On page 3 we print a small cut of the chimneys of the Mount Street buildings.

THE BRICKBUILDER

VOL. II. BOSTON, FEBRUARY, 1893. No. 2.

ARCHITECTURAL TERRA-COTTA.

Continued from January Number.

THE PROCESS OF ITS MANUFACTURE.

Enough may have been said about the material, and I pass on to speak of the manufacture. But before we enter upon the manufacturing proper, there are some preliminaries which claim our attention. The first of these is the setting out of the work in order to ascertain the number, size, and shape of the blocks required, so as to be able to give correct information for the making of the moulds out of which the blocks are cast, and the number of blocks to be cast out of them. This work requires to be very accurately done, so that there may be no waste of material, and that every block may fit its intended place. In any important building this is no mean task; it requires a practical knowledge of drawing and construction, a full acquaintance with the nature and capabilities of the material, a considerable amount of mechanical skill, and an insight and perception sufficiently keen to take in the ideas and requirements of the architect, to see the way through from beginning to end, and, if necessary, to point out any practical difficulties there may be in the way, and to suggest a remedy.

WHITE TERRA-COTTA CAPITAL IN GRACE CHAPEL, FLATBUSH, L. I. TAYLOR AND INGLE, ARCHITECTS, NEW YORK. MADE BY STEPHENS, ARMSTRONG AND CONKLING, PHILADELPHIA.

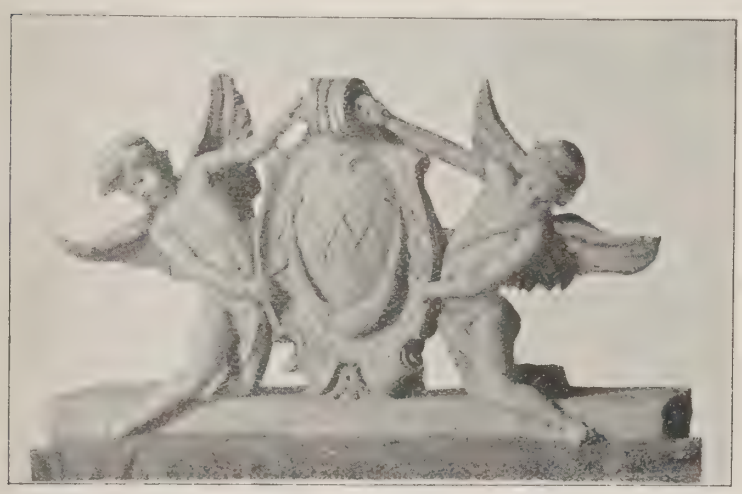
Having ascertained what is required, the next step is to prepare the moulds. These are made of plaster, and are taken from a plaster model made to the exact form of the blocks required, only increased to allow exactly for the shrinking of the clay. For this, unless it is done in the first instance, the architect's drawing has to be carefully enlarged, a reverse profile has then to be made in strong sheet zinc or other suitable material, and with this a plaster moulding is run, which is cut up jointed, and squared to the required size and shape. Any particular models requiring notches, sinkings, returns, enrichments, etc., have to be treated in a special manner. Great care is requisite in the preparation of these models, as upon the accuracy of them depends in a great measure the correct fitting together of the blocks, and the trueness of the work when placed in the building. The least twist or imperfection in these will repeat itself in the mould, in the block, and eventually in the building, proving a vexation and a perpetual eyesore.

The model having been perfectly prepared, a piece mould is then taken from it, in such manner as to allow of its being easily withdrawn without injury to the model. These moulds are so interlocked as to be readily put together, and form a substantial receptacle for the pressing of the clay. In making the moulds, also, some considerable skill and practical knowledge and experience are required, and more especially for the work that is enriched or under cut — any slovenliness or bungling in this is sure to prove fatal to the work.

It must be confessed that in the performance of these preliminaries, the terra-cotta manufacturers in the past have been sadly deficient. They have had a work thrust on them for which they were not prepared, and the importance of which they did not fully realize. The making of a few moulds for chimney-pots, vases, and such like things, that required no exact dimensions and no particular nicety of fitting, had been about the full extent of their experience; and they thought by such workmen as were then in their employ, they should succeed in this new and more important branch. In this they have been mistaken, and to this they are now fully alive. They now see the necessity of having men of superior ability, specially and technically trained for the work, and we may confidently expect that the terra-cotta of the future will be more appropriate to the purpose, and more exact in form than the generality of it has been in the past.

I come now to what I have called the manufacturing proper. In speaking of this, I think we cannot do better than begin with the raw material, and follow it through all the stages of its manufacture. Let us first take up the surface, or naturally plastic, clays. The preparation of these, in order to secure satisfactory results, is even more

elaborate than for the hard consolidated ones. It is so, because of the grit and other impurities they contain, which must be thoroughly eradicated before they are in any way fit for the purpose designed. To accomplish this, the clay has first to be thoroughly incorporated with



RED TERRA-COTTA CARTOUCHE

OVER MAIN ENTRANCE, HOTEL WALDORF, NEW YORK. H. J. HARDENBERG, ARCHITECT, NEW YORK. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA.

water, and by a process of blunging, brought into a state of liquidity, for which purpose several methods are devised. It is then passed through a very fine sieve, by which all the impurities, in the shape of stone, grit, etc., are extracted. From the sieve it passes into the drying pan, until it is full to the depth of four or five inches, and there remains until, by the action of the fire underneath, the water is sufficiently evaporated, when it is taken out and passed through the pug mill, which is a machine composed of blades, revolving in a cylinder. By this process the clay is brought into a high degree of plasticity, and when cooled down is ready for the hands of the presser.

With the hard marls and fire clays, the process of preparation in some respects differs from the preceding ones. These clays are the better for having been exposed to the influence of the atmosphere for some three or four weeks before being taken in hand. They are then, by means of powerful machinery, reduced to the condition of a very fine powder, for which several different kinds of machines have been invented. As the clay comes from the machine, it is sifted and incorporated with an adequate supply of water, in which state it is passed through the pug mill with the same result as before. The working up of these clays is improved by their being left in stacks covered up for some days before being used. If there is any mixture of clays from different strata, in order to secure equality of shrinkage, great exactness in the proportion of each should be preserved, or it will be found that the material made from one mixture will be smaller or larger than from another. In such case it will be impossible for terra-cotta, made from the two, to come together and make good work. Some manufacturers endeavor to modify the shrinkage of each of these clays by adding "grog," made of the same material, burnt and ground up. In that case the proportions must also be kept, and I am of opinion that such an admixture does not improve the ring and soundness of the material produced.

The clay having been prepared, it is taken in hand by the presser, who, in the first place, forms a block of it of a workable size near at hand upon his bench, from which, by means of a wire, he cuts slices of sufficient thickness and lays them down upon the battering slab; these are well battered down in order to drive out the air and compress them, from which he cuts suitable sizes for the work he has in hand. It is customary to well dust the mould to prevent the clay from adhering to it, then to cover all the several pieces of the mould with the clay and well press it upon them. As the pieces are taken up and put together, great care should be taken that none of the clay gets between the joinings of the mould, so as to throw it out of shape. When all the several pieces are adjusted, it is strongly braced to keep it in form, and then by the hand all the several joinings are well puddled and pressed together so that the adhesion may be complete. Afterward, if any webbing be required for the strengthening of the block, it is cut and placed in position. The pressing is then practically finished, and after remaining some time in order to stiffen, it is turned over upon a straight board, the mould is taken off, and the block left to dry. In this work of pressing no great skill is required, and the commonest laborer may soon be brought into the way of doing it. It only requires care and a determination to do it perfectly. If the clay is not well battered, or if not well

RED TERRA-COTTA CAP,

(2 FEET HIGH,) FOR ELIZABETH HALL, STETSON UNIVERSITY, DELAND, FLA. GEO. T. PEARSON, ARCHITECT, PHILADELPHIA. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA.

pressed upon the mould, or if the joinings are not well made, it is sure to turn out faulty; but if these points are carefully attended to, a sound block will be the result.

Too great haste in drying is very injurious to the work and especially when first taken from the mould. It should

not be placed in way of draughts or exposed to any considerable degree of heat, as by this the outside is formed into a crust before the inside has time to attain the same degree of dryness: this prevents the proper shrinkage of the clay, and produces cracks, warping, and twisting. At first it is essential that the drying process should proceed slowly and gradually in order to produce good work.

When it has become sufficiently dry it is taken up by the finisher, who carefully takes off the seams, and, if it is at all drawn out of shape, he restores it, and then cleanly polishes the face. Far greater skill is required for the work than for the pressing, and only the best workmen should be employed at it; for, with whatever nicety or exactness the mould may have been prepared, it will be all neutralized unless the finisher does his work properly. The blocks will now be in such a state of solidity that they may be placed in a better position for completing the process of drying.

VIEW OF AMES BUILDING, COR. LINCOLN AND ESSEX STS., BOSTON.
SHEPLEY, RUTAN AND COOLIDGE, ARCHITECTS.

There are some kinds of terra-cotta which require special treatment at the hands of the finisher, and particularly that made from the red plastic clays. There are few of these clays but what are impregnated with what is called a lime juice, created by the action of the rain-water with which it is saturated, and which always contains a small quantity of carbonic acid, corroding the particles of stone it contains. During the process of drying, as the water evaporates, this "juice" rises to the surface, forming a kind of scum, which, if not removed before burning, greatly disfigures the material. To wash it over with any coloring matter only adds to the disappointment, as this will soon peel off and disclose the white surface beneath.

Now we come to the process of burning. This is a very critical time in the production of terra-cotta, and at the onset let me say that it is important to have a competent and well experienced man for this work, as a little carelessness or unsound judgment here will soon frustrate all the preceding endeavors, and render them quite fruitless. He must understand the quality and nature of the material placed in his hands, and be able to perceive beforehand with exactness the effect which the heat he administers will have upon it. He must know the time to apply it, the quantity to give, the degree to attain, and almost the precise moment when to withdraw or discontinue it, attending the process with a watchfulness and anxiety which a due sense of his responsibility alone can inspire.

There are several kinds of kilns used for the burning of terra-cotta, each maker very probably adopting those he considers best suited to the nature of his material. We cannot suppose that they would allow any pecuniary considerations to stand in the way of their erecting those which in their judgment will do the work most perfectly. Some of the kilns are made square and some round; some with a down-draught and some with an up-draught. But the best for the purpose, in my opinion, whatever the material may be, is a cone muffled kiln, as by this the object desired, viz., a thoroughness and equality in the burning and a clearness and regularity in the color, is best attained; the heat becomes more equally distributed, while the clay is protected from the damaging effects of the sulphur and flame. The additional cost of erecting these kilns, and the extra amount of fuel required in the heating of them, are more than repaid by the superior substance and purity in colors of the material they produce.

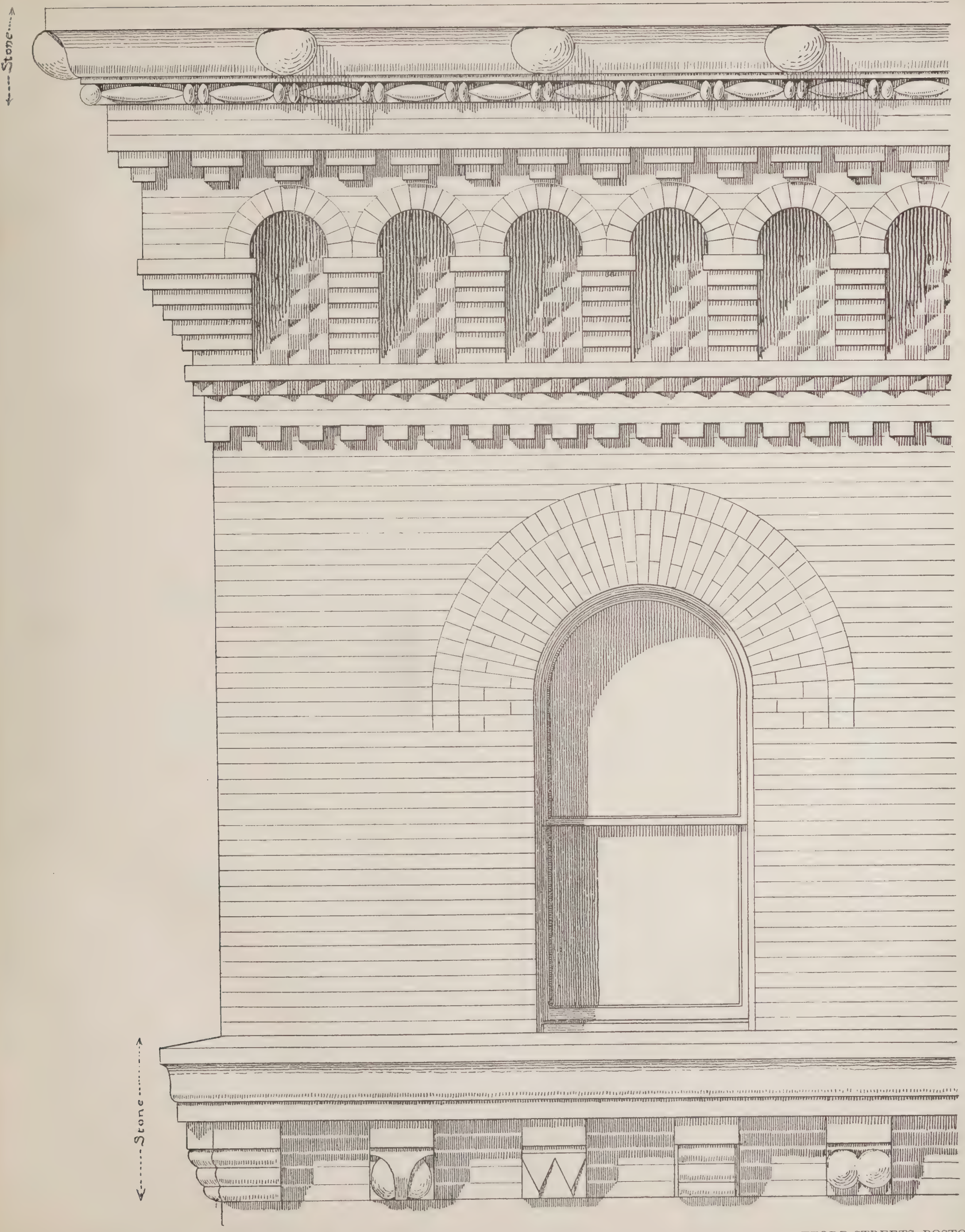
The blocks being sufficiently dry, they are placed in the kiln. The clays differ as to this condition — some kinds requiring to be more perfectly dry than others. It is then for some days subjected to a very low heat, in order

FOR SCALE ELEVATION, SEE PLATE 14.

to drive out the remaining moisture, and to evaporate the salts; the heat is afterwards gradually increased until it is brought to the required height. There is also great difference with regard to this: some terra-cotta will only bear a good, red heat, whilst others require a white heat, enough to melt iron, or even steel. To aid the burner in deciding when the heat has been sufficiently applied, trial pieces put in for the purpose are continuously extracted, and when this climax is attained, the firing is discontinued and the kiln left to cool.

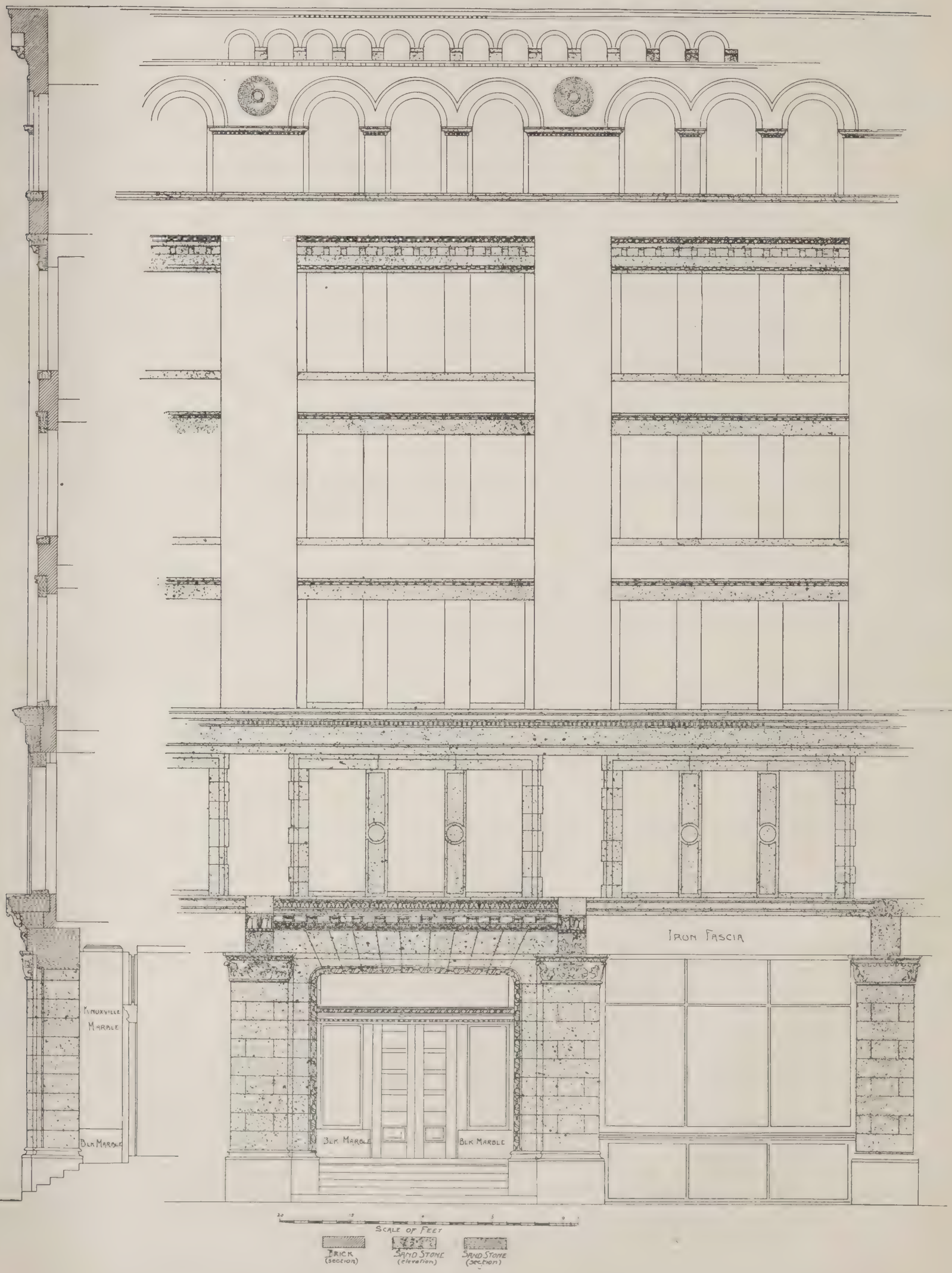
(To be continued.)

During hot weather it is of great importance in erecting buildings in stone or brick to thoroughly wet every stone or brick before it is laid. The water not only removes any dust that may have accumulated and would prevent the mortar adhering, but it causes a much better adherence between the bricks or stones and the mortar than would otherwise be the case, because of the tendency to suck up moisture in dry and hot weather. This may seem at first sight an item of little importance, but there is more in it than may appear. — *Canadian Architect.*



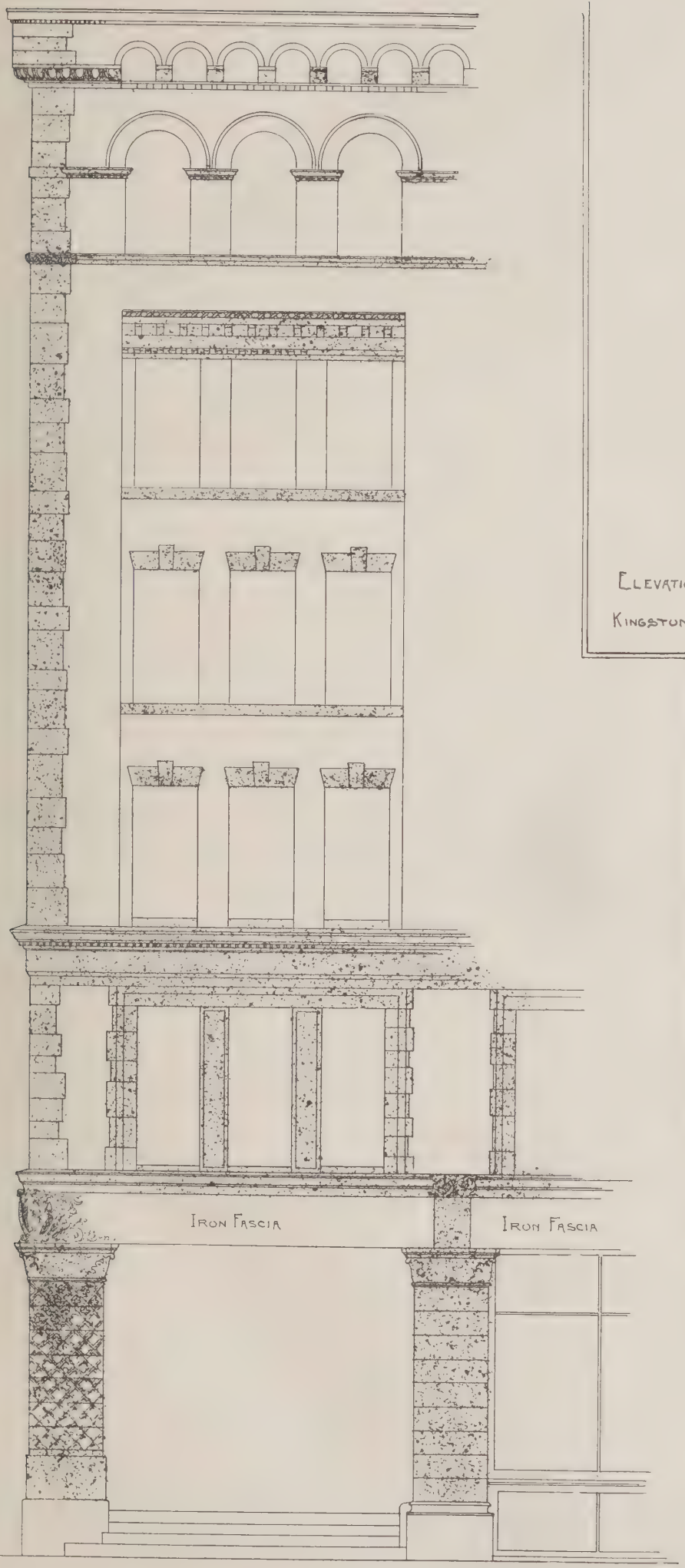
RTION OF THREE QUARTER INCH SCALE DETAIL, EXACT SIZE. FORT HILL BUILDING, CORNER HIGH AND HARTFORD STREETS, BOSTON.

SHEPLEY, RUTAN & COOLIDGE, ARCHITECTS, AMES BUILDING, BOSTON.

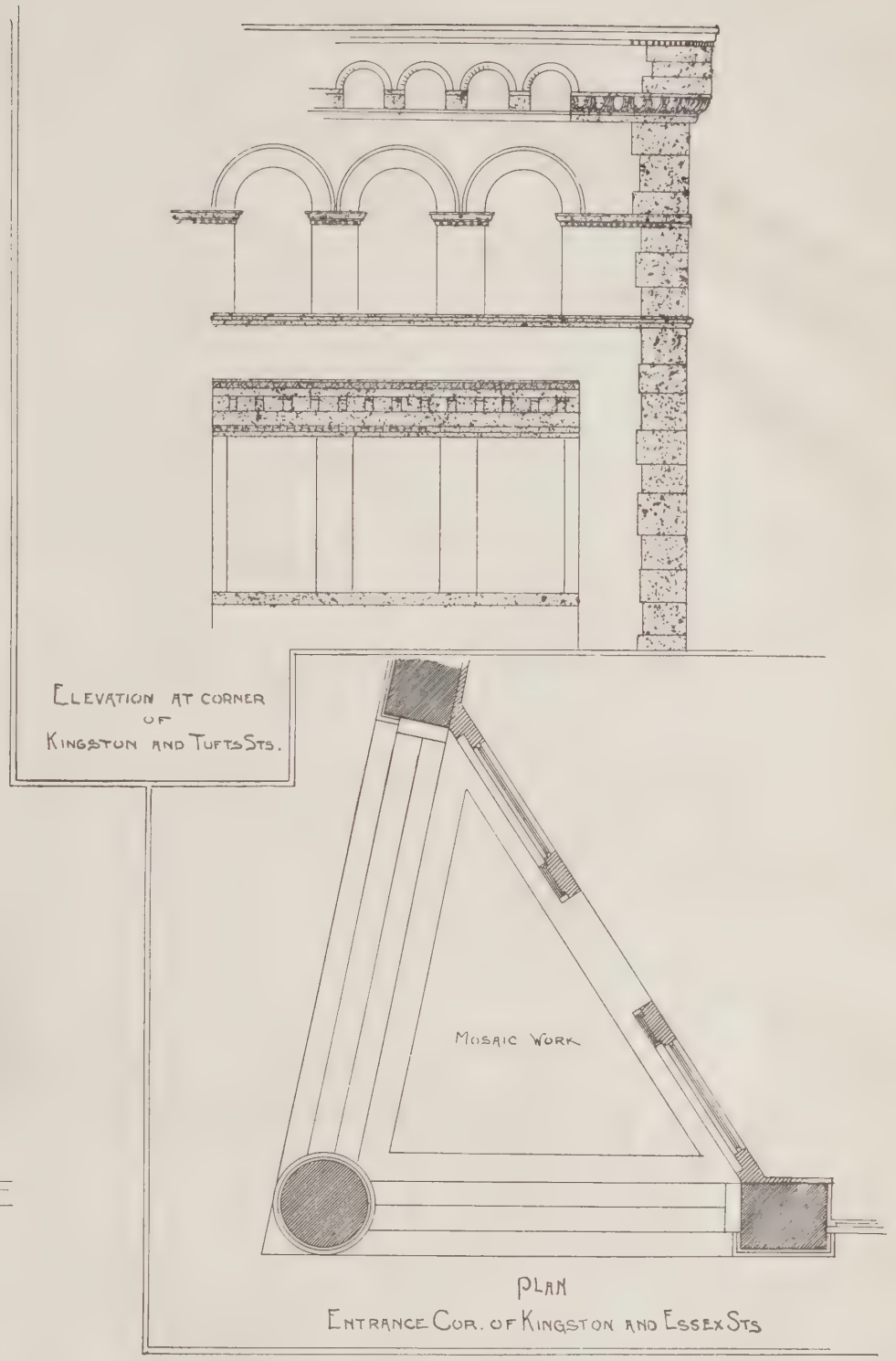


EIGHTH SCALE ELEVATION OF CENTRAL BAY OF THE AUCHMUTY BUILDING, BOSTON.

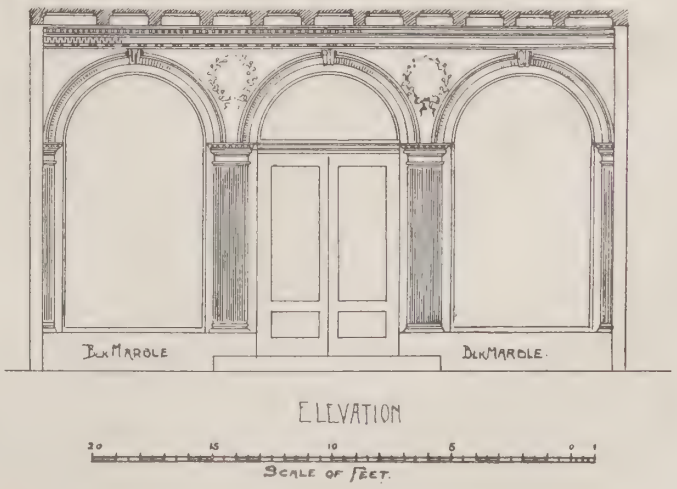
WINSLOW & WETHERELL, ARCHITECTS.



ELEVATION COR. KINGSTON AND ESSEX STS



PLAN
ENTRANCE COR. OF KINGSTON AND ESSEX STS



ELEVATION

EIGHTH SCALE DRAWINGS OF PORTIONS OF THE AUCHMUTY BUILDING, BOSTON.

WINSLOW & WETHERELL, ARCHITECTS.

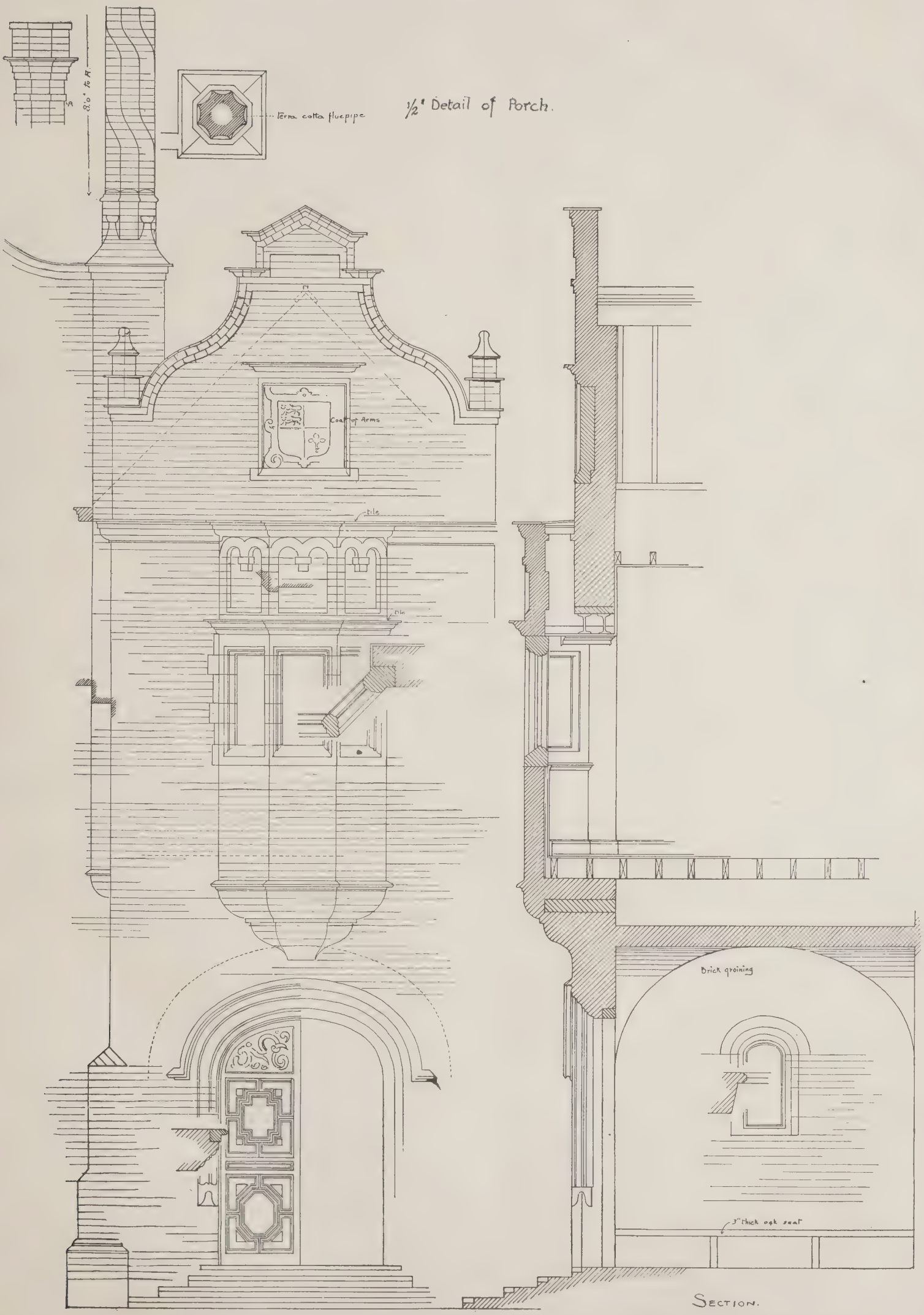
ELEVATION OF THE BUILDING AT NOS. 134 TO 144 LINCOLN STREET, BOSTON, MASS.

WINSLOW & WETHERELL, ARCHITECTS.

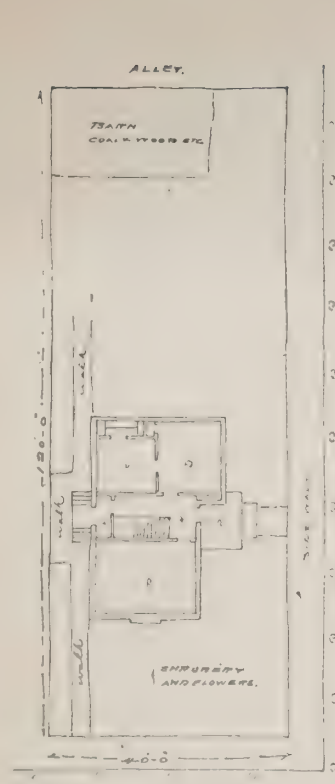
THIS PLATE IS EXACTLY 1¼ INCH SCALE.

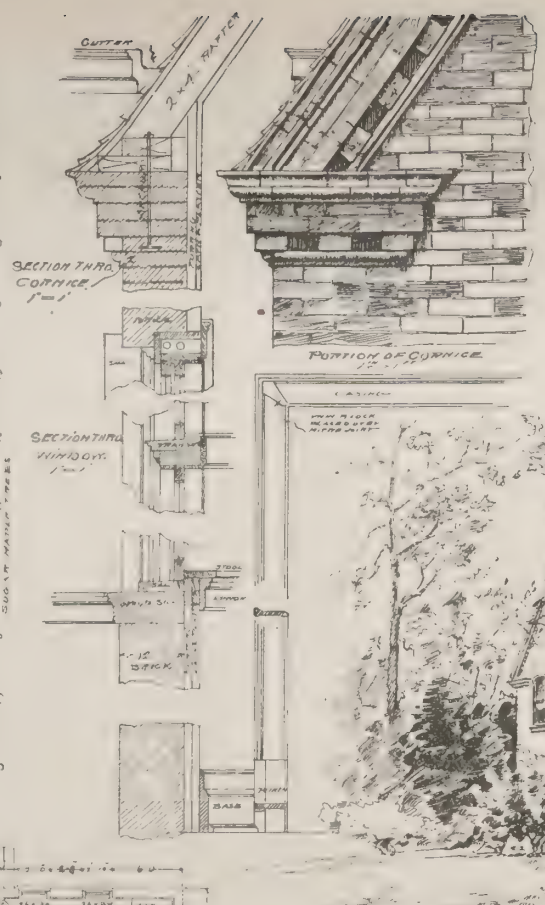
LINCOLN STREET ELEVATION, BUILDING CORNER LINCOLN AND BEACH STREETS, BOSTON.

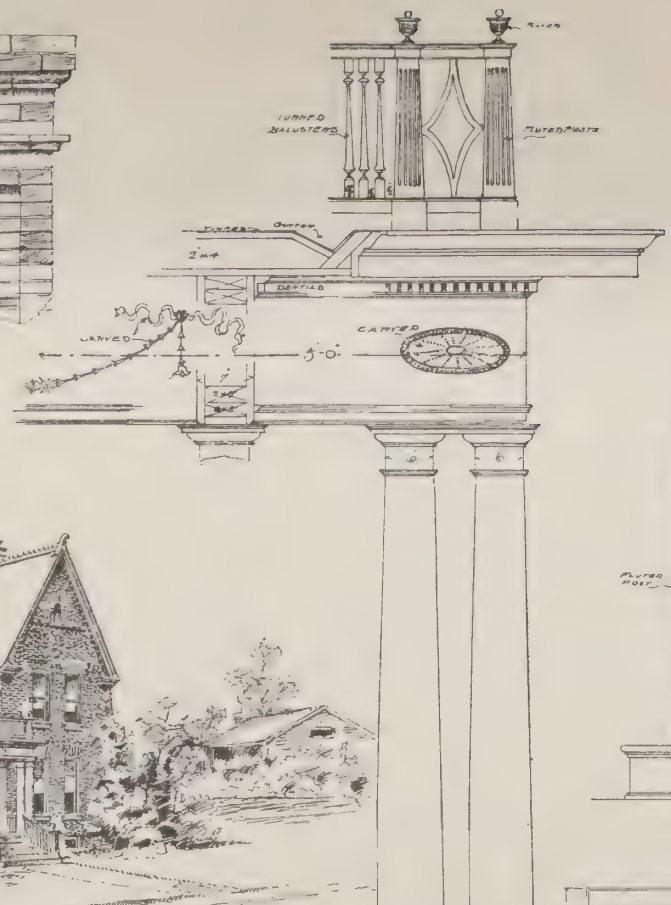
WINSLOW & WETHERELL, ARCHITECTS, 3 HAMILTON PLACE, BOSTON.

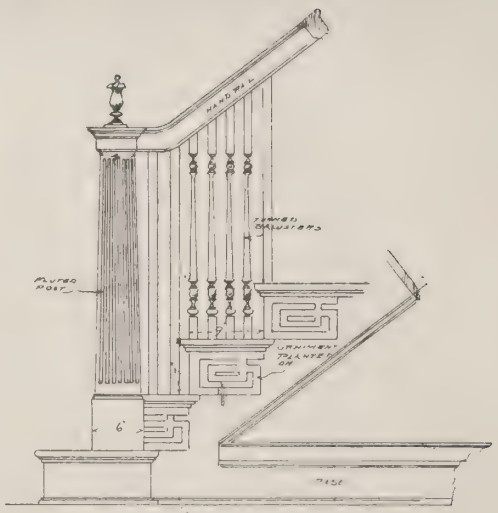


DETAIL OF BRICKWORK BY ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENGLAND.



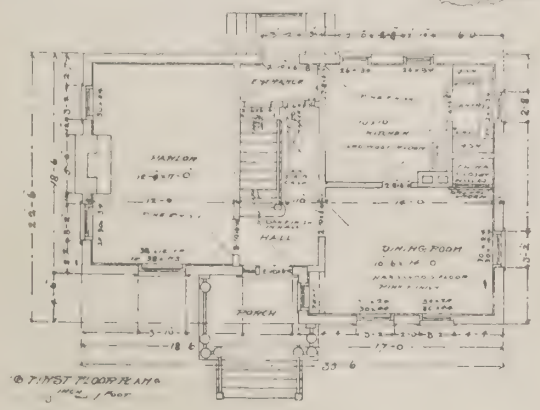


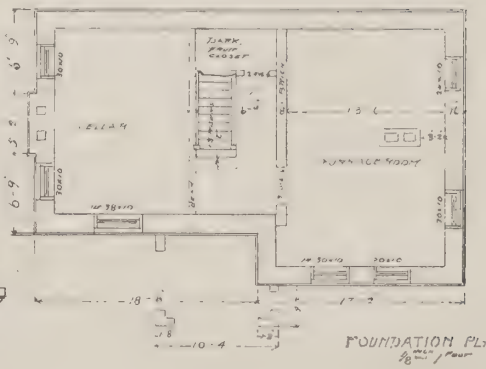




DETAIL OF NEWEL POST HAND RAIL STEP AND BALUSTER. 1" = 1'-0"

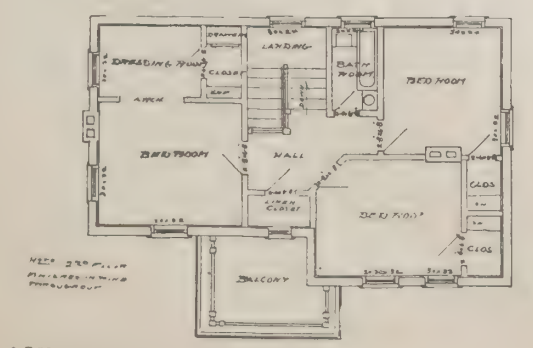
PERSPECTIVE SKETCH.





FOUNDATION PLAN
1/8 INCH = 1 FOOT

PLANS ELEVATIONS AND DETAILS OF SMALL BRICK COTTAGE SUBMITTED BY "J.I.C."

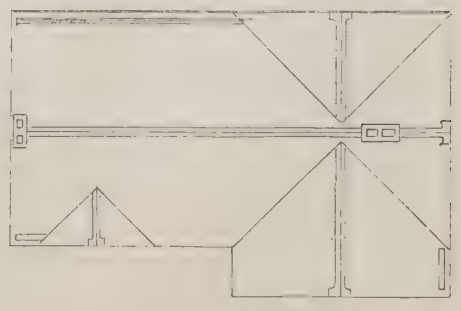


SECOND FLOOR PLAN
1/8 INCH = 1 FOOT

FRONT ELEVATION
1/8 INCH = 1 FOOT

SECTION.

NORTH ELEVATION.
1/8 INCH = 1 FOOT



ROOF PLAN 1/8" = 1'-0"

BRICKBUILDER COMPETITION FOR A $2,000 BRICK HOUSE.

DESIGN BY L. H. PARK, RACINE, WIS.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF BRICK AND TERRA-COTTA ARCHITECTURE.

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WE were congratulating ourselves that we had at last made up lost time and the February number would be out on date, when fire totally destroyed the plant of our plate-makers, the Art Publishing Company at Gardner, Mass. We lost in that fire not only our plates for the February number, but also the originals and many others we had prepared for future issues. There was nothing to do but publish without illustrations, or delay the issue until new ones could be prepared. The latter course was adopted. It is a curious coincidence that the three buildings burned in the great fire of March 10 should form so large a portion of the newly prepared plate matter, and that the other two mercantile buildings were barely saved. The views we publish also show quite clearly the grouping of the burned buildings. The corner of the Ames Building (detail of which we published in No. 1, Vol. I.) is that on Lincoln and Essex Streets, where the fire broke out, and where the jumping from the windows occurred. Down Essex Street to the right, separated from the Ames Building by a narrow alley, is the small building of the Ludlow Mfg. Co. (p. 16), of which the Essex Street elevation with all details was also published in the initial number of this paper. The Ludlow Building joins the Auchmuty Building, commonly known as the Brown, Durell Building, and a view of the latter, looking down Kingston and Essex Streets, is also one of our illustrations (p. 17). The scale drawings of this building are the subjects of plates 10 and 11 of this number. All these buildings were destroyed, the Ames Building utterly. Portions of the walls of the other two remain, possibly in condition to be used in rebuilding. The two buildings on Lincoln Street, at the corner of Beach, were diagonally across from the Ames Building, and on the same side as the Lincoln Building which was wholly destroyed.

The forced delay in publication makes this number of particular interest as illustrating the most disastrous conflagration Boston has had, with the exception of the great fire of 1872.

Three and a half millions' worth of property has, it has been estimated, been destroyed, or a round million more than was consumed in the terrible fire which occurred in the same district on Thanksgiving Day, 1889.

It is no accident that the same region is visited again and again by such disastrous and almost irresistible conflagrations. It is due to the fact that this district is occupied by large wholesale stores, the construction of most of which is of a kind to invite just such disasters. The occupants of these stores and the real estate owners who supply their wants are themselves mainly to blame for the destructive character of the conflagrations that have occurred, because they insist upon the very conditions that make these fires so irresistible, viz., enormous, unobstructed floor areas and huge window openings. To this fact and the narrow streets the destruction of the other day is mainly due.

The structures in question consist merely of an enclosing wall surrounding the area to be occupied by the building, with but few cross walls. In the case of the Ames Building there is practically but one cross wall, leaving 14,000 feet of floor area unobstructed by anything but the most combustible partitions.

These enormous spaces are filled with a series of floors of so-called "slow-burning" construction supported on iron columns more or less protected by fireproof coverings, and the rooms are filled with merchandise of the most inflammable nature. Nothing could have burned more rapidly than the "slow-burning" construction in question; not that this method of construction is not a good thing properly used; but with floor areas so enormous, a fire of such great heat is so rapidly produced that the heavy timbers are little better than so much kindling. The area surrounded by brick walls with huge openings at the bottom, and filled with nothing but combustibles is, in reality, a gigantic scientifically constructed furnace with its draft openings at the base. The Ames Building, in which the fire originated, is divided, indeed, by partitions, but these partitions were of Georgia pine sheathing, without plaster, with glass in the upper part and over the transoms of the doors to light the corridors. Walls, floors, and ceilings, everything inside the enclosing brick walls was of wood, and the floors occupied by wooden counters loaded with merchandise. Once a fire well started in such conditions nothing could save the building or the similar buildings contiguous to it.

Through the large window openings rushed the flames carrying the conflagration across the narrow streets, and, what with the strong wind that was blowing at the time, the wonder is not that so much destruction was wrought, but that the fire was arrested where it was. Had the Ames Building been subdivided, as it should have been, by a series of heavy brick fire walls into areas not exceeding five thousand square feet, it is probable that the fire could have been confined to the compartment in which it broke out, or at any rate have been prevented from spreading much beyond that.

In the case of the Auchmuty Building the unobstructed area is 21,000 feet; here the construction is of ordinary floor joists covered with patent plastering on wire lathing, with magneso-calcite between the floorings; this construction seems to have stood the test better than the "slow burning" construction of the Ames Building, for it would appear that had the roof of the Auchmuty Building been as fire resisting as the floors it might have been saved. The fire attacked it from the roof, and when that fell sufficient fuel was provided to set fire to and destroy a great part of the floors also.

The Lincoln Building was of ordinary floor joists and lath and plaster, and though completely destroyed, its frequent fire walls were of great assistance in stopping the fire.

It is no accident that fires in Boston are so much more destructive than they are in Manchester (England), London, or Paris, notwithstanding our better organized and equipped fire departments. The London Metropolitan Building act restricts areas without brick fire walls to five thousand square feet, and the window areas of the warehouses in London or Manchester are much smaller than in any of our recent commercial buildings.

It is to be hoped that the so obvious lesson of this fire will not go unheeded. The new building law of Boston, which went into effect less than a year ago, restricts the floor areas to ten thousand feet. But, as we pointed out at the time, this restriction is not enough, and it is to be hoped that the disastrous fire that has just occurred may lead to the half-way compromise measure of that law being amended in the direction of further restriction. Indeed, Mayor Matthews has already petitioned the legislature that the floor areas allowed in second-class buildings be reduced to six thousand square feet. Nothing should be allowed to prevent this reduction of area being embodied in the law. Still it is a comfort to know that when the buildings in the burned district are rebuilt the areas without brick walls will be very much smaller than they were in the buildings just destroyed. Roof hydrants and other such devices are but palliatives. What is needed is more frequent brick walls running up through the roofs, so that the buildings shall be something better than mere huge enclosures filled with combustibles.

Of the buildings destroyed three were among the most beautiful commercial buildings of the country, and it is the more to be regretted that their construction should not have been more substantial. We refer to the Ames Building on Lincoln Street, by Shepley, Rutan & Coolidge, the Auchmuty Building (occupied by Brown, Durell & Co.) on Kingston Street, by Winslow & Wetherell, and the little Ludlow Building on Tufts Street, by Peabody & Stearns, which owed its destruction to being wedged in between its larger neighbors.

That whole district of Boston was (and still is indeed) somewhat remarkable for the number of really beautiful commercial buildings which it contained. We publish views of all three of these buildings. Of the Ames and Ludlow Buildings details also will be found in our issue of January, 1892, and of the Auchmuty Building in this issue. All three buildings are remarkable for their appropriate treatment of brickwork, as are the Shoe and Leather Exchange on Bedford Street by Hartwell & Richardson; a building just finished on the corner of Lincoln and Beach Streets, by Winslow & Wetherell, illustrated by perspective and elevation in this number, and several others by different architects on Lincoln Street. As we have said, the whole district is a somewhat remarkable one architecturally, and it is a pity that the methods of construction adopted should not have been such as to promise more permanency. It was in the same district that stood the beautiful Ames Building, designed by the late H. H. Richardson, which was

destroyed from similar causes in the Thanksgiving Day fire of 1889. Its site is now occupied by a less successful yellow brick and white marble building, by Shepley, Rutan & Coolidge.

In commenting upon plates of details of the Boston Chamber of Commerce published in *The Architectural Review* for January, that paper says editorially:—

"The details of the Boston Chamber of Commerce are convincing in one respect — that is, that the building would have been better in brick than it is in rock-faced granite. There is a very foolish predilection among building committees for granite buildings, and, as granite is an expensive material to cut, rock-faced granite is advocated. The result is destruction of scale and clumsiness of effect, and unnecessary heaviness of walls.

"Granite is usually chosen according to the desires of the committees, because there has been for years the idea prevalent that it is the best expression of durability. As a matter of fact granite is a very perishable material as compared with brick and terra-cotta, either under the action of frost or fire."

It is coming to be more and more recognized in works of engineering, as it is already recognized in building, that unprotected iron is not a permanent material. Iron bridges are being more and more regarded as the merely temporary structures they really are. This will necessarily bring about the more frequent use of brick in these constructions. The Pennsylvania Railroad, probably the most progressive and the best managed road in the country, has come to the conclusion that the life of an iron bridge is even shorter than of a wooden one. Wooden bridges cannot, however, be used in railroading on account of the danger from fire, and are at best but temporary makeshifts though preferable to iron on all accounts except for fire risk. The Pennsylvania road is substituting masonry bridges for iron ones. If well built they will last indefinitely; they do not need painting; they do not need inspecting, and so are vastly cheaper as well as better in the long run. In England brick bridges are all but universal in railroading, and in the large cities most of the railroads enter on tracks elevated on massive brick viaducts, the space below the arches being used for warehouses for merchandise, as is the case with the arches of the viaduct leading to the Brooklyn Suspension Bridge in New York. In some parts of England a very hard dark gray brick of large size is used in the construction of railroad bridges, and is both handsome in appearance and very durable. As to the comparative value of brick and stone in engineering work, brick has the advantage in every respect if thoroughly well made and of the best quality for strength and hardness, and if the mortar used is of the best. In brickwork the mortar is even of more importance than with stone on account of the greater number of joints and the larger proportion of mortar which therefore necessarily enters into the work. But the quality of the brick and the mortar assured, brick is in every way preferable, both on account of ease of handling, cheapness of construction, and durability. There will, of course, be cases where stone for one reason or another is to be preferred, but such cases are exceptional. As a rule, the brick and the stone are better separate than when used together, both constructionally and artistically. The ugly combination of red brick and gray granite, of which some engineers seem so fond, is especially to be avoided.

Of recent terra-cotta work, that of the Hartford Savings Bank, Peabody & Stearns, architects, is remarkable for its richness and exquisite modelling. Through the courtesy of the Perth-Amboy Terra-Cotta Co. we have obtained large photographs of all the details and a liberal selection will be made for illustration in an early issue.

COMPETITIONS.

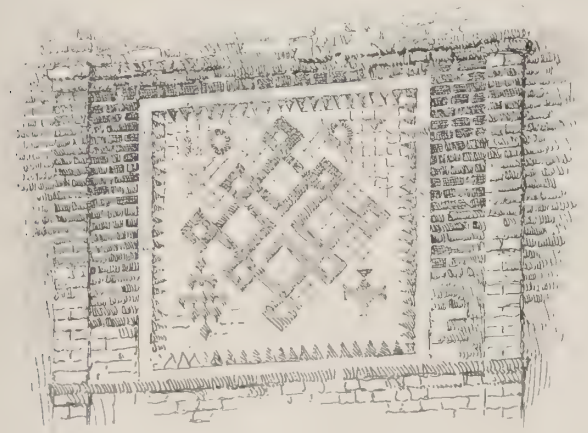
RULES: All drawings must be sent in marked with some motto or device and accompanied by a sealed envelope marked with the same, containing the full address of the competitor. The designs are judged by a committee of well-known architects, solely upon their merits, the names of the designers remaining unknown until the award is made, when the sealed envelopes corresponding to the devices on the designs are opened. To protect the interests of our advertising patrons it is stipulated that no ornamental bricks not found in their catalogues shall be used. This is really no restriction, for practically all of the leading manufacturers will be found represented in THE BRICKBUILDER. To encourage the study of effective use of the commoner materials, of two designs equally good, preference will be given that showing a skilful use of ordinary bricks to secure ornamental effect.

COMPETITION NO. 9.

JUDGMENT.

The programme in brief is a call for drawings of brick detail. Quality of rendering to determine the choice of best five. Taste shown in the selections of subjects also to be considered.

Forty-six drawings have been submitted. Of these the first five are published in this number. Subsequently a number of the others will be published, and at the time of publication detailed criticism will be made. The best



Panel above arch. La Valloune Normandy.

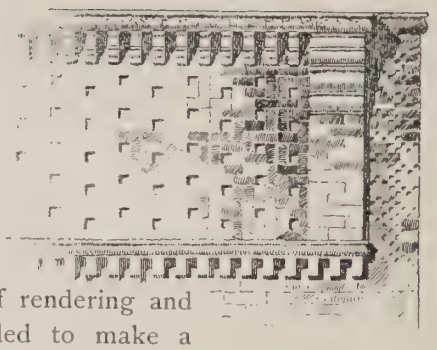
DRAWN BY CLAUDE FAYETTE BRAGDON.

five drawings of the whole number submitted are, in my judgment, the following:

A BRICK PANEL. Drawn by Mr. Claude Fayette Bragdon, Rochester, and signed with a "Maltese Cross." For those whose style of drawing is stiff and mechanical, a study and copying of this would be helpfully corrective. A great variety of line, a little permissible cross lining to deepen the color in the right place, a deliciously free technique throughout, not every brick shown, and no two bricks rendered in just the same manner.

DRAWING FOR A BRICK CORNICE by Charles D. McGinnis, of Boston. *Nom de plume* "Hub." A bright catchy sketch, black, half-tone and white knowingly used. The sunny edge of projections have no outline. A well-selected brick subject successfully rendered.

ENRICHMENT AT THE TOP OF A WALL. Drawn by Mr. Walter G. Peter, Washington, D. C. *Nom de plume* "Capitol." Beautiful differences in color, just enough of rendering and of white intermingled to make a very pleasing color scheme. The line also like the two preceding subjects of excellent character and variety.



A BRICK GATEWAY. Drawn by Mr. C. Howard Lloyd, Boston. *Nom de plume* "Plume et Encre." Brick work shown in excellent manner, in varying color, some not rendered. Color of drawing as a whole successful. Except for too great use of wavy line, the technique is very pleasing.

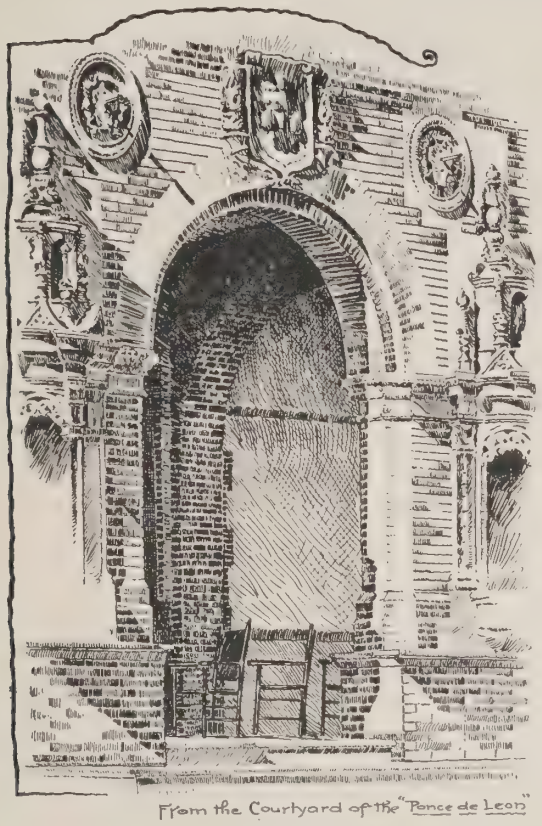
DRAWN BY C. HOWARD LLOYD, BOSTON.

A BRICK DOORWAY. See illustration on page 19. Drawn by Mr. E. W. Donn, Washington, D. C. *Nom de plume* "Washington." Though considerable else than brick is to be seen, yet so large a proportion is brick, the subject is a suitable one. The drawing is exceptionally bright and sparkling. A strong dark, and lights introduced among the half-tones, lines omitted frequently, have produced a lively, brilliant rendering.

D. A. GREGG.

The passage of a new building law at Indianapolis, increasing the thickness of brick walls, has increased the consumption of brick to from 20% to 40%, and greatly improved the quality of construction there.

BOOKS AND PAPERS.



DRAWN BY E. W. DONN, JR.

The January *Clay-Worker* contains considerable of interest to architects and builders. It opens as usual with some architectural subject, this time, the brick pavilion at the Paris Exposition coming up for consideration. While the writer of the accompanying description has a good grasp on architectural ideas, we think he gives undue praise to the French. As a matter of fact there is little modern brickwork in France or Germany that is not utterly stupid. Far better things are done every day in this country, and if the brick exhibits at the Columbian Exposition are intrusted to any of a score or more American architects whom we could name, better results would in all cases be obtainable.

An article signed by E. C. W. on bricks bearing cuneiform inscriptions, we will reprint, by permission of *The Clay-Worker*, in a future number. "Dry Press Hints," "Practical Points about Brick Paving," and "Chemistry for Clay-workers" have more interest for the manufacturers than for the users of brick. A Fire Engine House at Louisville is illustrated by a half-tone, which we wish had been made rectangular, so as to cut off the upper part of the tower, which, to our notion, is a failure. J. W. Crary, Sr., contributes a paper which is commented on elsewhere in this number. A full-page half-tone is given to a very interesting photograph of the works of the Central Pressed Brick Co., of Cleveland, and this photograph, contrasted with the mental photograph of some brick works of "practical" men we have seen, explains why some makers, taking advantage of improved equipment, working in a *factory* and not a *yard*, turn out perfect bricks in large quantities with inappreciable loss from accident or delay. Indeed, this same number, in a humorous article on Ebenezer Jonathan with illustrations perhaps a little exaggerated, but, in the main, true, offers instructive comparisons.

The Jarden Brick Co., of Philadelphia, which has for some years been turning out a large quantity of first quality pressed and ornamental bricks, according to *The Clay-Worker*, has torn away from the "traditions" of its forefathers, and is putting in a whole new dry press plant, the basis of which will be six large Boyd presses. A description of the plant is published.

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The *Architectural Era* for December publishes a half-tone of the residence of E. C. Pope, Esq., at Cleveland, designed by Mr. S. R. Badgley, of that city. Mr. Badgley has used, with very good effect, on the broad roof surfaces, a tile made by the Rapp Roofing Tile Company, of New Philadelphia, Ohio. This is one more addition to the unfortunately few tile roofs in the United States.

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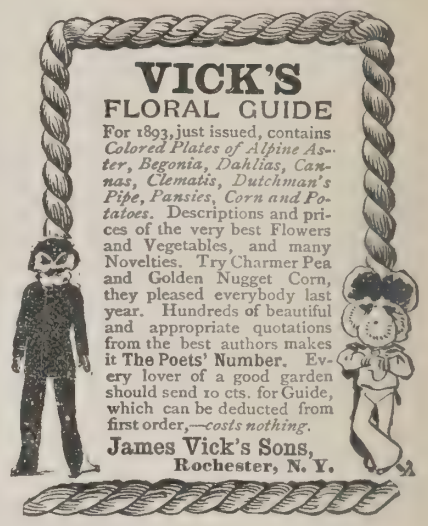

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ARCHITECTURAL TERRA-COTTA.

* * *

CATALOGUE AND ESTIMATES UPON APPLICATION.

* * *

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1341 ARCH STREET

THE BRICKBUILDER

VOL. II. BOSTON, MARCH, 1893. No. 3.

ARCHITECTURAL TERRA-COTTA.

Continued from February Number.

THE MODE OF ITS APPLICATION.

BUFF TERRA-COTTA CAPITAL,
ON BOYD, WHITE AND CO.'S BUILDING, PHILADELPHIA. FRANK R. WATSON, ARCHITECT, PHILADELPHIA. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA.

I CONFESS that I approach this part of my subject with some degree of diffidence, it being truly, if not absolutely, the prerogative of the architect, into whose province I have no desire to invade. But from my long and intimate acquaintance and experience with this work, I think that I may be permitted to make a few suggestions for the guidance of those who are not as yet initiated into its use. So far, therefore, I venture to say, that designing for terra-cotta work does not very materially differ from that for stone, the difference lying principally in the jointing of the work so as to meet the nature and requirements of the material; and this should be done on the best methods of construction. All attempts at imitating masonry should be carefully avoided, giving to terra-cotta a standing and an individuality peculiar to itself, so that at first sight of a building, by the very manner of its construction, the material may be recognized, and the words "artificial stone," which is sometimes given to it, may cease to be applied.

I am of the opinion that if this is done with sound judgment and architectural skill, the beauty and symmetry of the building will be enhanced, so that, instead of terra-cotta being called "artificial stone," it will have an attraction peculiar to itself.

To illustrate the above it is impracticable to spare an opening of any considerable width in one block; the work must be jointed up according to the ideas of the architect, but so as to allow of as many pieces in the sill, and as many voussoirs in the arch or head as is consistent with the appearance of strength and beauty. The jamb blocks, also, must be restricted in height not to exceed one foot or thereabouts. The mullions, transoms, and tracery should be made in as small pieces as the design will admit. And, if there are several orders in the depths of the mouldings, these should be as much as possible divided, care being taken that each alternate case bonds well upon the other. The strings and cornices should be reduced to as short lengths as convenient, and if the several orders in the mouldings of a cornice may be separated without prejudice to the constructional lines and strength of the work, it should be done; and the facing blocks should be made in as small sizes as the style of the building will permit. I think that the foregoing suggestions are enough to serve as a guide to any who may not have had any extensive experience in working out drawings for terra-cotta construction, and I may safely leave it in their hands to carry the principles

BUFF TERRA-COTTA CAPITAL,
ON BOYD, WHITE AND CO.'S BUILDING, PHILADELPHIA. FRANK R. WATSON, ARCHITECT, PHILADELPHIA. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA.

SALMON TERRA-COTTA CAPITAL,
(2 FEET HIGH, 2 FEET 6 INCHES WIDE,) ON N. Y. DRESSED BEEF CO.'S BUILDING, 43d STREET AND FIRST AVENUE. J. C. CADY AND CO., ARCHITECTS, NEW YORK. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA.

here indicated throughout every detail of the building. In concluding, let me answer very briefly some of the objections that have been urged against the use of terra-cotta. The first of these is, its liability to twist and go out of shape, and so cause the lines in a building which should be rigidly straight to become distorted. I think that I have already said enough to show that such a defect does not necessarily belong to the material, but is produced by a want of skill, or by carelessness and inattention. Undoubtedly, there are many instances to be produced, which, taken by themselves, would give force to this objection; but such illustrations have been taken from the infancy of the material struggling into life, and must not be brought up as full-grown specimens of its power and capabilities. As the demand for it has increased, it has gathered strength, knowledge, and skill There are some good specimens of terra-cotta building at length to be seen, and there is no reason why every specimen in the future should not be equal to them, if not superior. The method to adopt, in order to obtain a good terra-cotta, is to pay a good price for it, and not have it unless it is good. If this plan was more generally adopted, all the inferior and inefficient makers would be shut out of the market, or be spurred up to make greater exertions for improvement, and the wretched specimens we sometimes see, and which make one blush, would soon become a thing of the past never to be recalled.

PORTION OF TERRA-COTTA FRIEZE,

HOTEL WALDORF, NEW YORK. H. J. HARDENBERGH, ARCHITECT. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA.

Another objection that has been, and is still, urged against the use of terra-cotta, is the time it takes to produce it, and the consequent slow progress of the structure where it is used. It cannot be denied that there has been some good ground of complaint in this respect, and I can readily conceive the irritation and disappointment which must have sometimes been caused by the delay in the delivery of this material. It would, no doubt, be instructive if we could sift out the cause of these delays, and I imagine that if we could do this, in nine cases out of every ten, the fault would not be chargeable to the material, but to some cause which, by foresight and precaution, might have been avoided. The maker has, perhaps, not been up to the mark; his appliances may have been insufficient, or his workmen inexperienced; his hands may have been too full, or he may have been too slack, and the price too low to stimulate or quicken him. Or, it is possible that the drawings may not have been delivered to him in time. It must have been observed, from what I have previously said, that there are certain stages in the manufacture, where hurry or push would be most injurious to the welfare of the work; and sometimes great delay is caused by having to press it unduly at these most critical times, in order, if possible, to supply it within a given time: the consequence is, that the material turns out faulty, and the whole process has to be gone over again.

RED TERRA-COTTA PANEL,

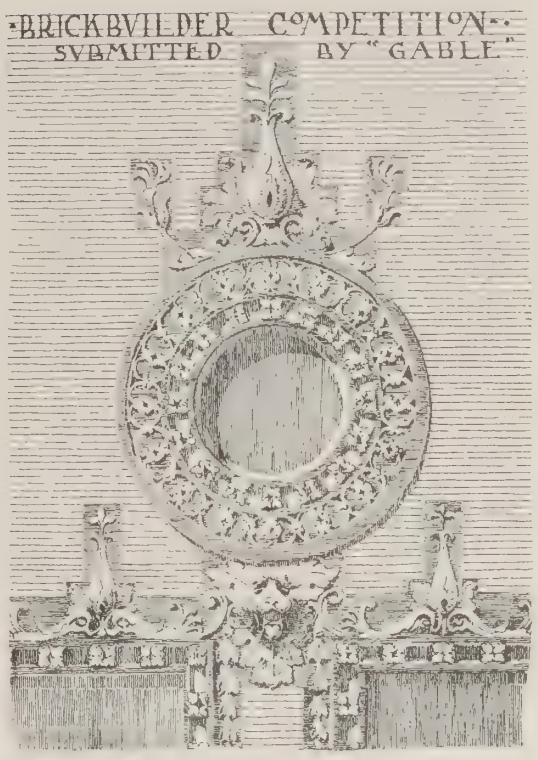
(7 FEET LONG,) IN HOUSES IN 69TH STREET, NEW YORK, FOR F. A. SCHERMERHORN. H. J. HARDENBERGH, ARCHITECT, NEW YORK. MADE BY STEPHENS, ARMSTRONG AND CONKLING, 1341 ARCH STREET, PHILADELPHIA, PA.

The process in the manufacture of terra-cotta cannot well be abbreviated, and the only satisfactory way of solving the difficulty, is to anticipate as much as possible the progress of the building. This may be done in the first instance by making a special contract for this work with the manufacturer himself, setting him at it some time before the commencement of the structure. Or, if this does not meet with the approval of the architect and his employers, it may be done by giving the manufacturer all possible time after the signing contract. Some six weeks are required for the production of terra-cotta of the ordinary kind; this, at least, should be allowed at the commencement of the work, and, if the whole of the detail drawings for the building are placed in his hands with all possible speed, instead of waiting, as is often the case, until one part is executed before others are furnished, then there can be no reasonable or justifiable excuse for any serious delays in the delivery of the goods.

To facilitate the speedy execution of the work, it is important that the whole of the drawings (as far as possible) should be placed at once in the maker's hands, so that he may have the whole thing before him, and be able to take each part up in succession without delay, and not have details doled out to him until a month or six weeks before the work will be required. In my experience, there have been many such cases where the hands have been comparatively standing still for some time, waiting for the next batch of drawings, and then, when the goods have not been forthcoming at the required time, the terra-

cotta has had to bear the blame; whereas, if the whole of the drawings had been furnished at the first, the thing might have been accomplished with ease. It may be that at the precise moment of the reception of the drawings there is other work in hand requiring attention, and the manufacturer cannot turn to this as quickly as he could wish; or, there may be some failure in the manufacture, which cannot always be foreseen or avoided, and which has to be replaced. Hence, the necessity of anticipating the progress of the structure, and of giving the maker all possible help as to time.

Let me now add a few words on the question of comparative cost. It would be unfair to strike any comparison between the cost of terra-cotta and Bath-stone, which is proverbial for its softness and undurability when exposed to the atmospheric gases of large towns. Yet there are instances where the two estimates have been simultaneously obtained for the purpose of economy, and of testing the cost, and that for terra-cotta is found to be the lowest, and has been accepted. But, speaking more generally, the advantage of terra-cotta in respect of cost depends principally or solely upon the number of blocks required of the same kind, or made out of the same mould. If there is only one, then the advantage is decidedly on the side of stone. If only a few, the cost may be equal. But as the numbers begin to increase, the balance in favor of terra-cotta preponderates. So that, taking a building of any considerable size, where the same details are carried through sets of windows, etc., and with a continuous run of strings, cornices, etc., terra-cotta will compare very favorably with any stone which can be obtained. In all buildings there are many features of which there is no great repetition. These must be set against those that are largely repeated, and the cost of mould-making distributed over the entire surface. It sometimes happens that the cost of a single doorway or other special feature of the design, taken by itself, is very great, because of the number of moulds it requires to make it; hence, in estimating the cost, it is well to take the building as a whole.



DRAWN FOR COMPETITION, No. 9
by HARRY E. PRINDLE, New York City.
One of the most beautifully rendered drawings of the lot, charming drawing of detail, and charming line, but can hardly lay claim to being a brick subject.
D. A. GREGG.

DRAWN FOR COMPETITION, No. 9
by G. F. CRUMP, Albany, N. Y.
Proper color, but labored line; hardly enough brick in the subject.
D. A. GREGG.

The advantage on the side of terra-cotta is greatly increased if there is a large proportion of moulded work, and especially if there is any great repetition of enrichments in the mouldings. And another and not unimportant one is that in all enrichments the exact simile of the artist's own handiwork is produced, instead of being left in the hands of masons or inferior artists to reproduce it, as it is in the case of stone. Of course there are certain things which tell upon the comparative cost of terra-cotta and stone, such as distance and locality, but the probabilities are very decidedly in favor of terra-cotta being the cheapest.

After the above remarks, it seems almost superfluous to say that in designing for terra-cotta work, if cheapness is to be obtained or is a consideration, it is desirable for the architect to keep the idea of repetition before him, and aim at that without impoverishing the design; this may be counterbalanced by an increased richness of the mouldings, and a larger amount of artistic ornamentation.

JOSEPH TIMMS.

In the Building News.

DRAWN FOR COMPETITION, No. 9
by HARRY C. WILKINSON, Auburn, Me.
A sparkling drawing. The selection is unfortunate having too little brick construction.
D. A. GREGG.

THE ILLUSTRATIONS.

Plates 17, 18, 19, 22 and 23 are devoted to the designs in the competition for a Faience Mantel offered by Fiske, Homes & Co., and Atwood & Grueby of Boston, and will be found fully described under the heading of competitions.

Plates 20 and 21 show the Newbury Street elevation of the Charlesgate Stables, on West Chester Park, Boston. We expected to secure a photograph of this recently finished building for this number, but will have to refer our readers to the next issue. This stable is an exceedingly good example of well handled, simple brick work. The lower story is of stone, as are the sills of the windows. The trimmings of the windows and the quoins are of lighter brick than the body of the building. The cornice is galvanized iron. Messrs. Peabody & Stearns are the architects.

Plate 24 gives, at three quarter scale, a detail of the Sheridan Club cornice (Chicago). This building, designed by F. Parmentier, Chicago, is illustrated by a photograph in the *Inland Architect* for October, 1892.

INTERESTING BRICKS.

From The Clay-worker.

THE modern American is imbued with the idea that this is the age of invention, and marvels and wonders over the ignorance of the past ages. What in the world did those poor benighted creatures do for the thousand and one comforts which our energy and enterprise have given to the ease of man? But if these people were ignorant of the telegraph and railroads, they were wise in another channel; they wrote books upon bricks.

While Layard, the great archæological explorer, was at work upon the ruins of Koyunjik for the second time and was directing the explorations in the royal palace of Assurbanipal, a noted warrior king of Assyria about 650 B. C., he came upon two small rooms, the floors of which were covered to the depth of twelve inches with fragments and pieces of bricks, or tablets of baked clay. It was evident that the accumulation was the rubbish of fallen walls. But the interesting part was, that each brick had been written upon both sides with cuneiform characters. Mr. Layard knowing the value of these inscriptions, packed many cases of the fragments, and sent them to the British Museum. In the vaults of that institution they lay for nearly forty years. George Smith, an engraver, at work upon the cuneiform texts used in the "Cuneiform Inscriptions of Western Asia," published by the British Museum, became so much interested in the meaning of his work, that he studied diligently all that was known of the ancient languages. His was a bright mind, and it was not long before he was puzzling over the cuneiforms of Layard's collection. Piecing and patching together the fragments was slow work, but worthy, for the result was part of an epic poem. The world of savants was all excitement.

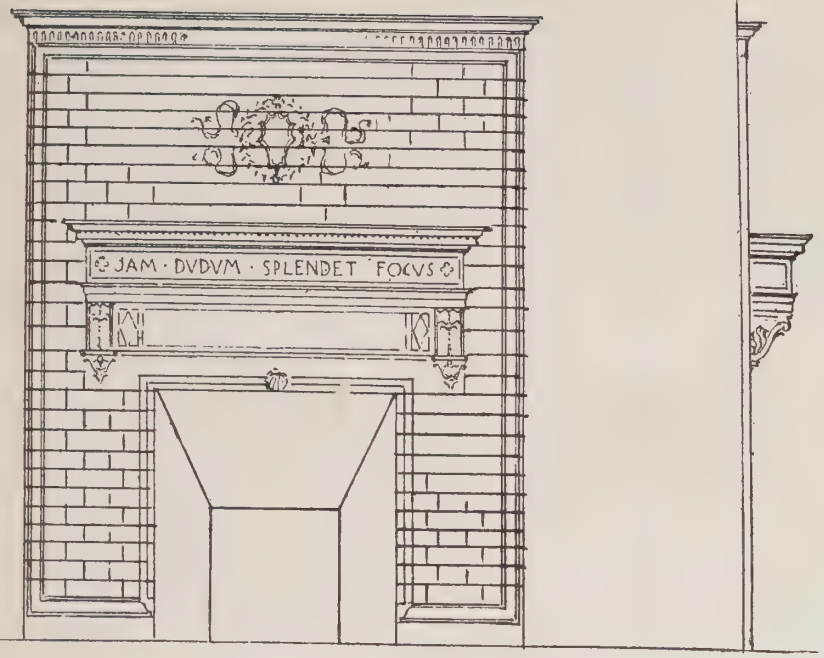
The London Daily Telegraph became interested and sent Mr. Smith to resume excavations at Koyunjik. Two times he returned home with his treasures and finally put together what is known as the "Deluge Tablet." His name was famous but his end was a sad one, dying at an early age of the plague, near the field of his labors. The last entry in his diary is pathetically typical of the man. He writes: "Not so well. If doctor were present, I would recover, but he has not come. Very doubtful case. * * * I do not fear the change but desire to live for my family. Perhaps all will be well yet."

The bricks or tablets vary in size, the larger ones being about nine by six and a half inches, while some of the smaller ones are no more than an inch square. The larger ones are flat, but the little ones are often convex. The moist clay tablet was taken in the hand and impressed by a stylus having a triangular section. The result was that the marks were wedge or arrow shaped. Different combinations of these wedges made cuneiform writing. The tablet after being so written on one side was turned over and inscribed upon the other. If it were a large piece, legs were stuck on at unoccupied places and used to stand the work on while the other side was being finished. After this, the tablet was baked.

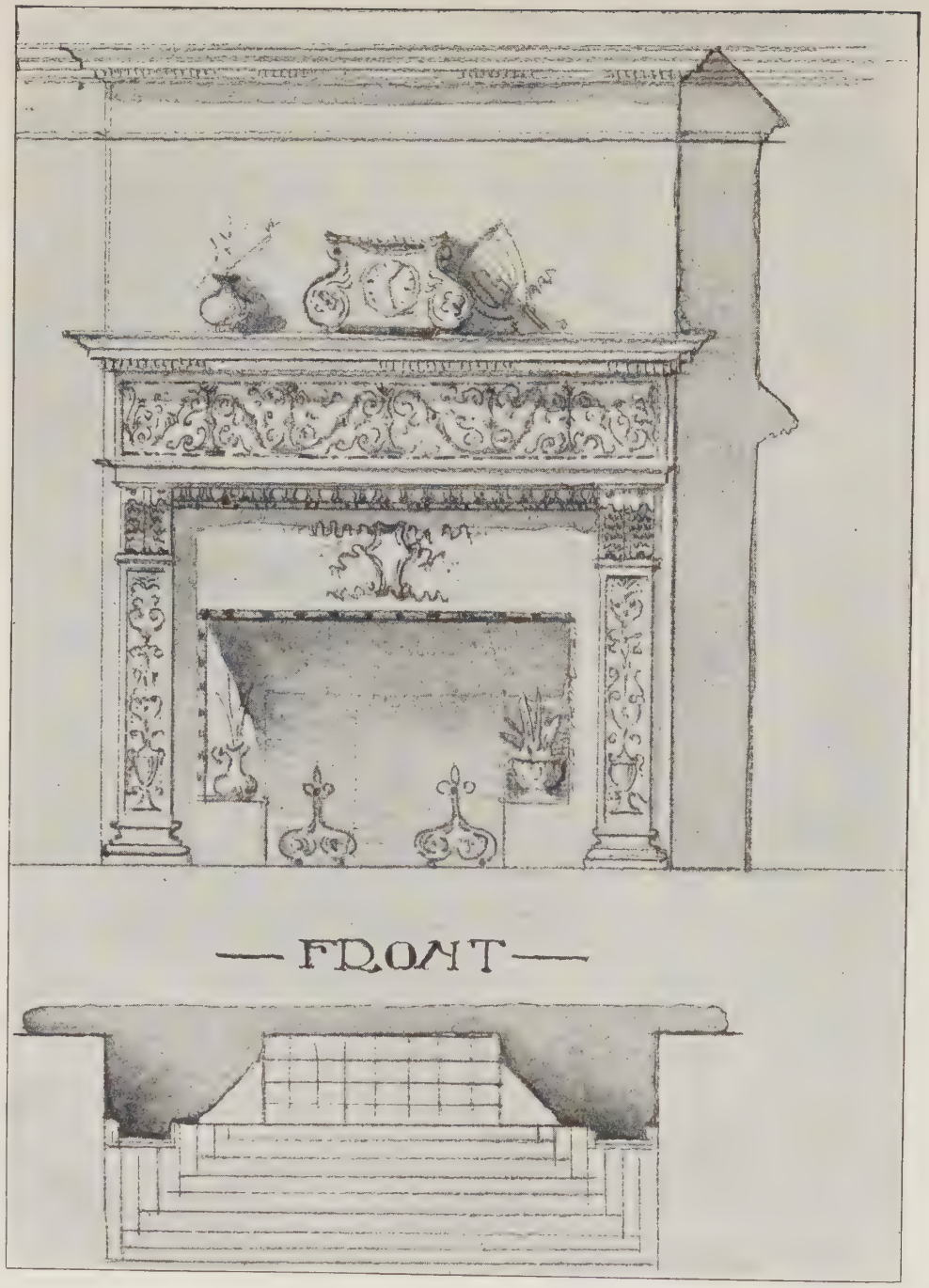
The tablets which made Smith famous are called the "Deluge Tablets," on account of their subject matter. The translation reads: "When heaven above and the earth below were as yet unnamed, Aspu and Mummu Tramat (abyss and the billowy sea) were the beginning of all things; their waters mingled and flowed together. That was the Primeval Chaos; it contained the germs of life, but darkness was not lifted from the waters and therefore nothing sprouted or grew. The gods also were not. They were as yet unnamed and did not rule the destinies of men. Then the great gods came into being, and the divine hosts of heaven and earth. And the days stretched themselves out, and the god Annu * * *." Here the inscription is yet unfound. Soon after, however, the thread is taken up again, and thus is unfolded a story that tallies in every way with the wonderful tale of Genesis, the deluge, and of the saving of the race in the person of one faithful to his gods.

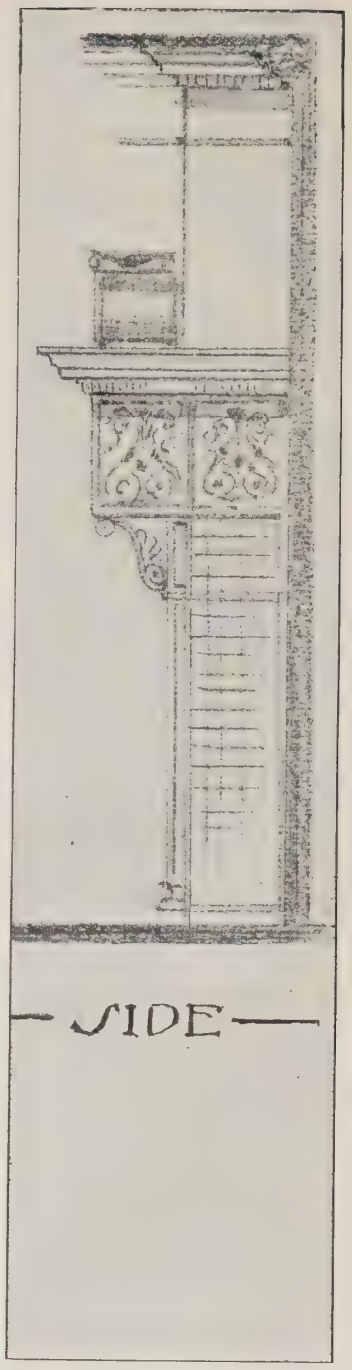
It is an honorable office, that of the clay-worker, to bridge over the abyss that separates us from the dark past; and it is something they should know and think about, for happiness is found where man honors the work of his own hands. E. C. W.

THE façade of the remodelled Ames building on Washington Street, opposite the Adams House, Boston, has been erected in a marvellously short time. It seems but a few days ago since we saw the terra-cotta, of which the entire façade is built, in process of casting at the works of the Boston Terra-Cotta Co., and now the boarding which enclosed the building has been taken down showing the front complete. This façade is one of the richest in the city. It was designed by Shepley, Rutan & Coolidge. We have in preparation for early publication several illustrations of it.



PRIZE DESIGN BY CHAS. D. MAGINNIS, BOSTON.

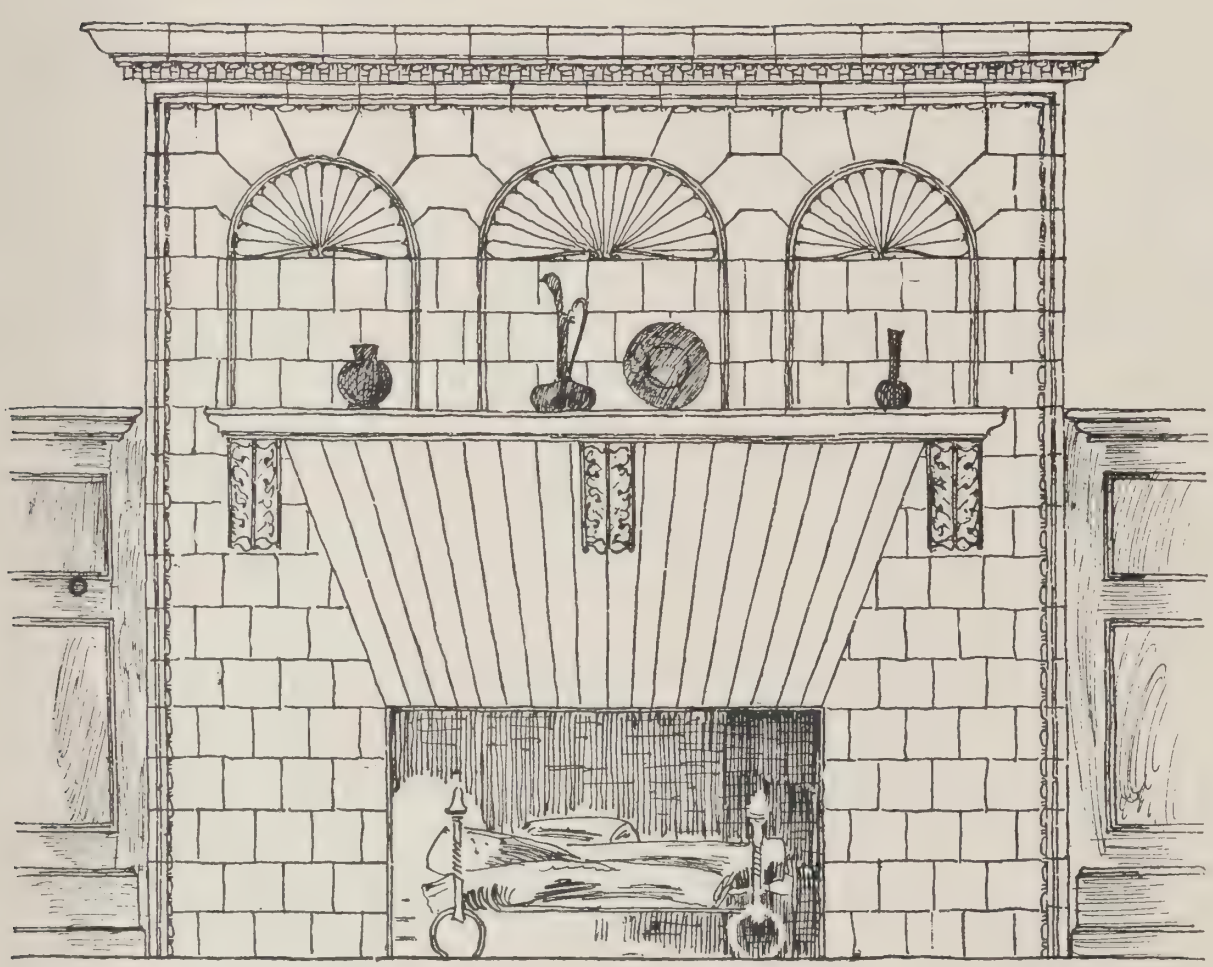




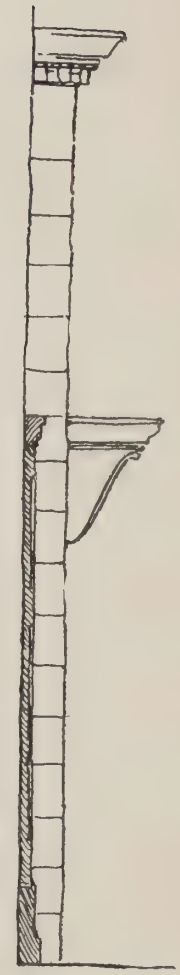
PRIZE DESIGN BY W. T. S. HOYT, ("ICTINUS,") BOSTON.

COMPETITION FOR A FAIENCE MANTEL.

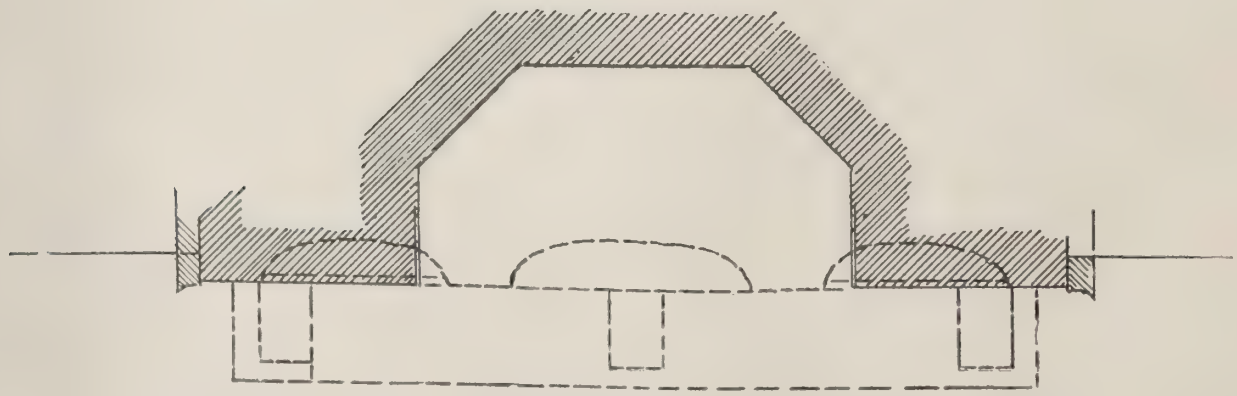
OFFERED BY FISKE, HOMES & CO., AND ATWOOD & GRUEBY, MAKERS, BOSTON.



ELEVATION



SIDE



PLAN

NOTE:
DOTTED LINES SHOW
PLAN ABOVE SHELF

PRIZE DESIGN BY CHARLES G. BACHMANN, ("JIM,") PHILADELPHIA.

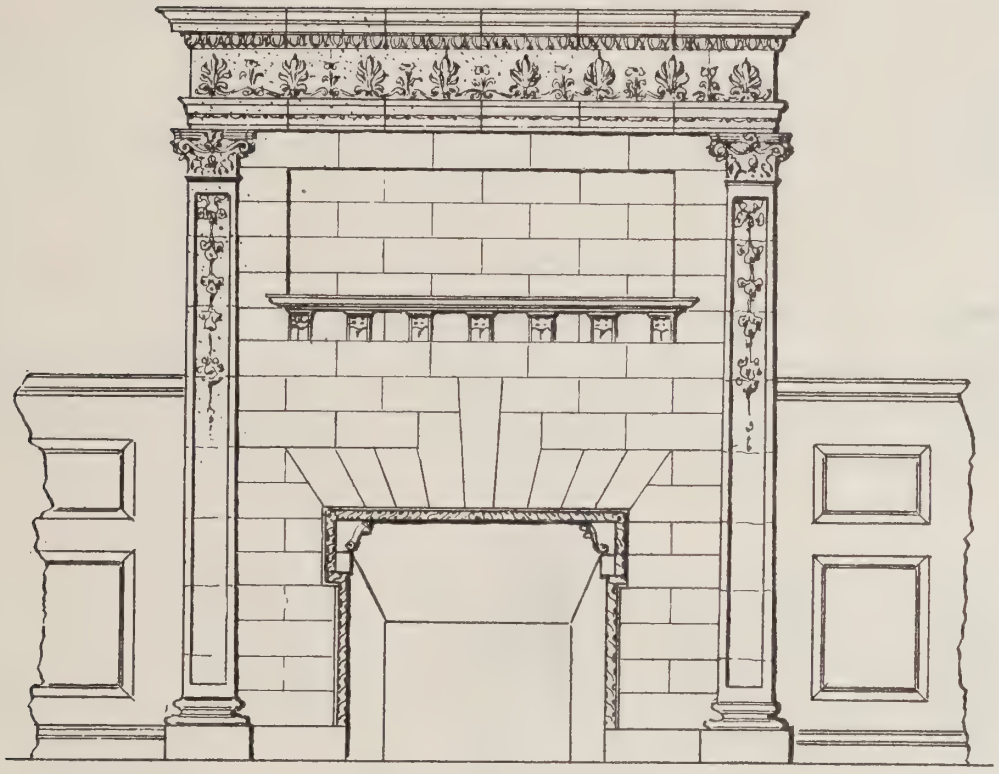
COMPETITION FOR A FAIENCE MANTEL.

OFFERED BY FISKE, HOMES & CO., AND ATWOOD & GRUEBY, MAKERS, BOSTON.

BRICKBUILDER COMPETITION

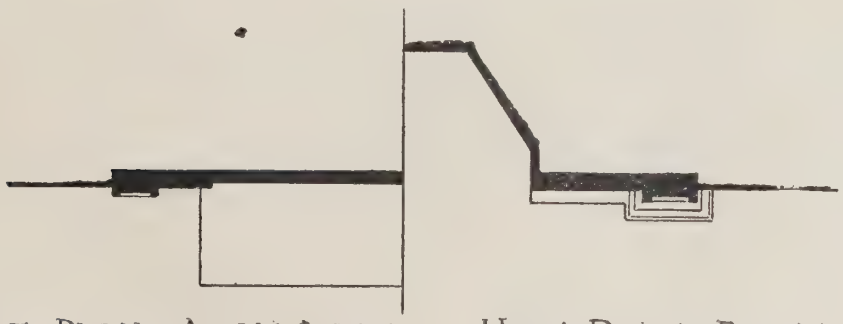
A FAIENCE MANTEL

DESIGN SUBMITTED BY



FRONT ELEVATION

SIDE ELEVATION



HALF PLAN ABOVE SHELF

HALF PLAN BELOW SHELF

SCALE ONE HALF INCH EQUALS ONE FOOT

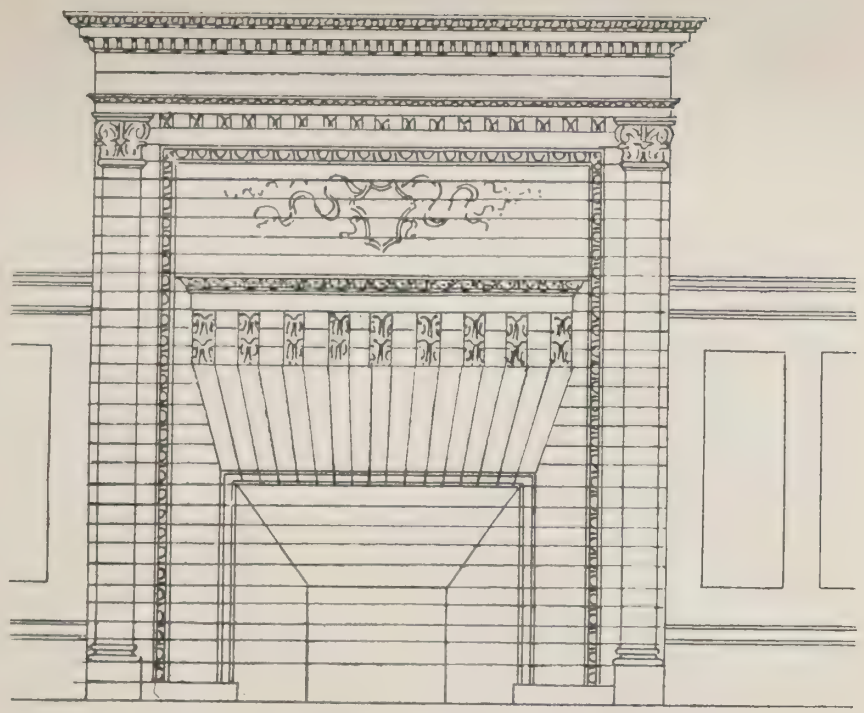
PRIZE DESIGN BY HERBERT E. STREETER, JR., BOSTON.

COMPETITION FOR A FAIENCE MANTEL.

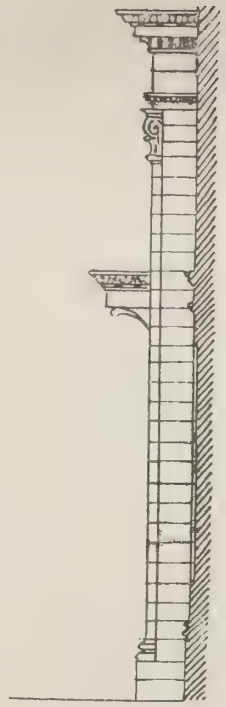
OFFERED BY FISKE, HOMES & CO., AND ATWOOD & GRUEBY, MAKERS, BOSTON.

CHARLESGATE STABLES, BOSTON, FOR KENNEY & CLARK, NEWBURY STREET, ELEVATION ONE-EIGHTH INCH SCALE.

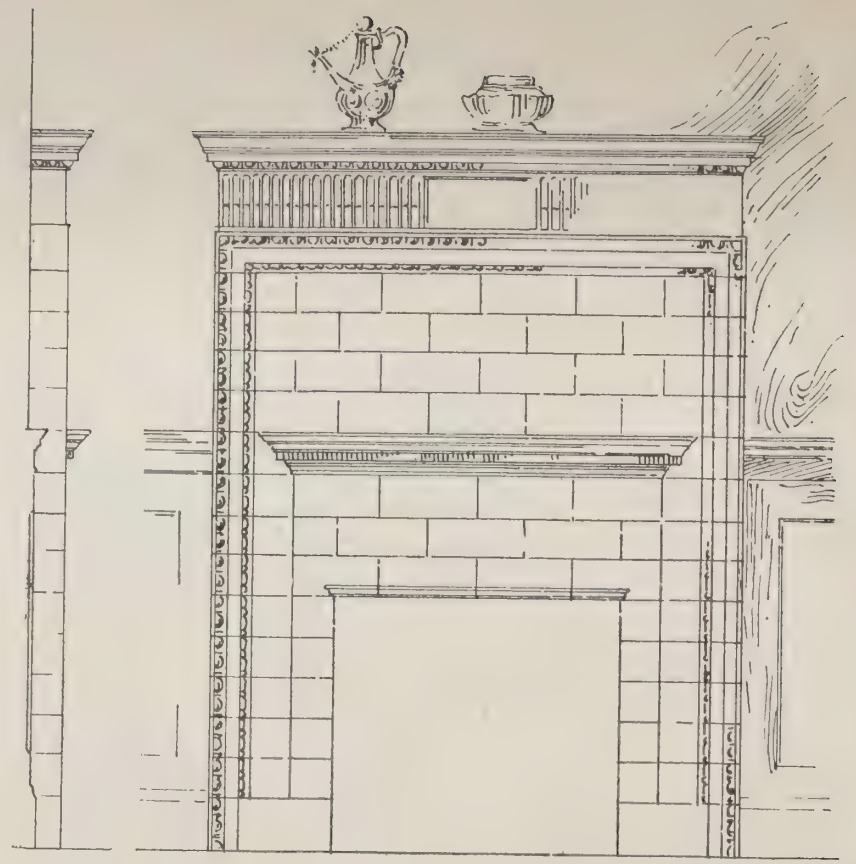
PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.



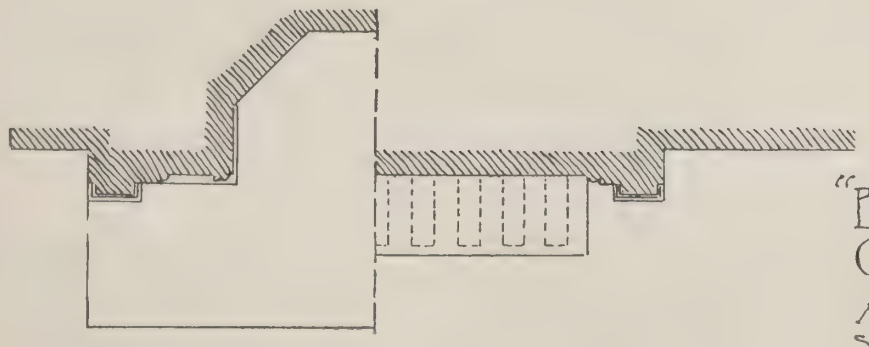
FRONT·VIEW



SIDE·VIEW



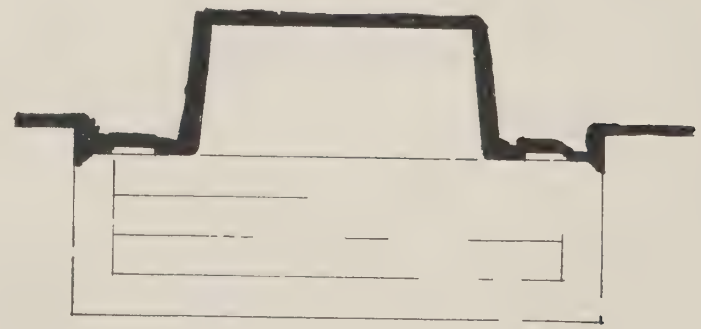
·½ INCH·SCALE·



·HALF·PLAN·
·BELOW·SHELF·

·HALF·PLAN·
·ABOVE·SHELF·

"BRICKBUILDER"
COMPETITION·FOR
A·FAIENCE·MANTEL
SCALE ½ INCH = 1 FOOT·
SUBMITTED·BY "HIC"

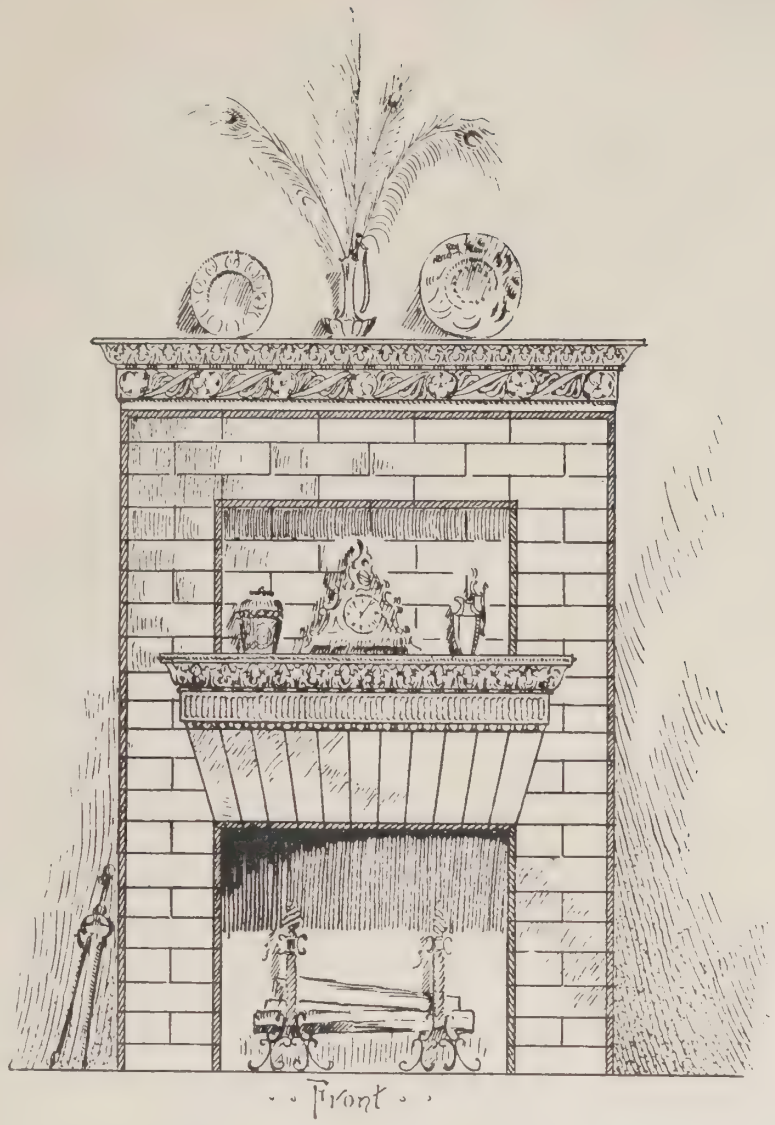


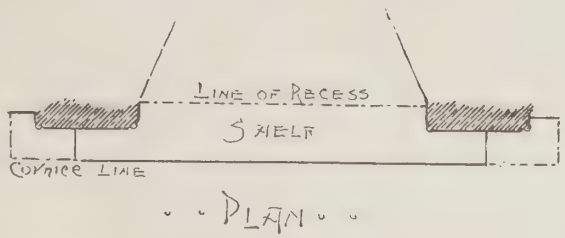
DESIGN BY W. A. HIRSCH, CHICAGO, ILL.

DESIGN BY C. G. VIERHEILIG, ("JAG,") GRAND RAPIDS, MICH.

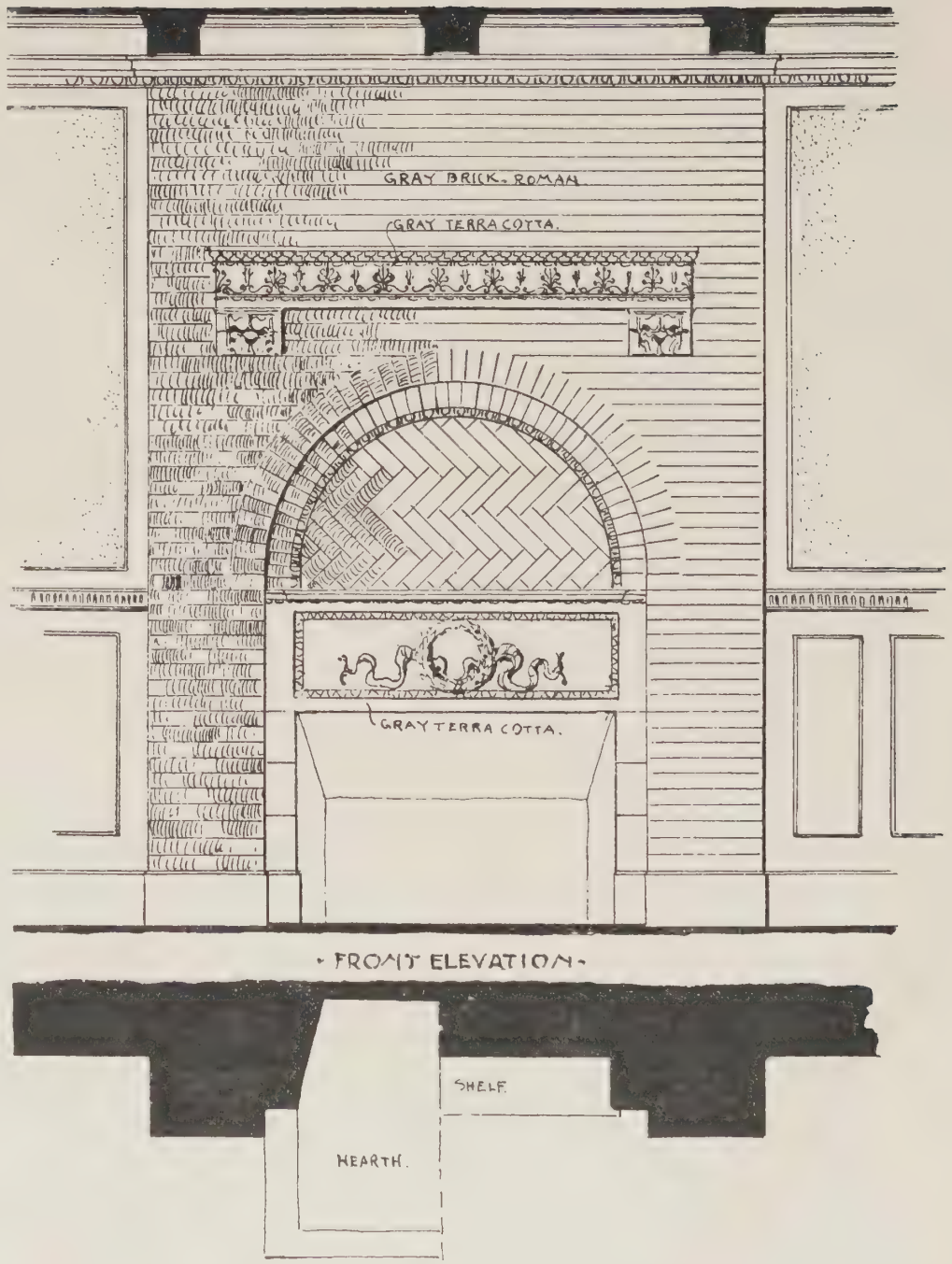
COMPETITION FOR A FAIENCE MANTEL.

OFFERED BY FISKE, HOMES & CO., AND ATWOOD & GRUEBY, MAKERS, BOSTON.





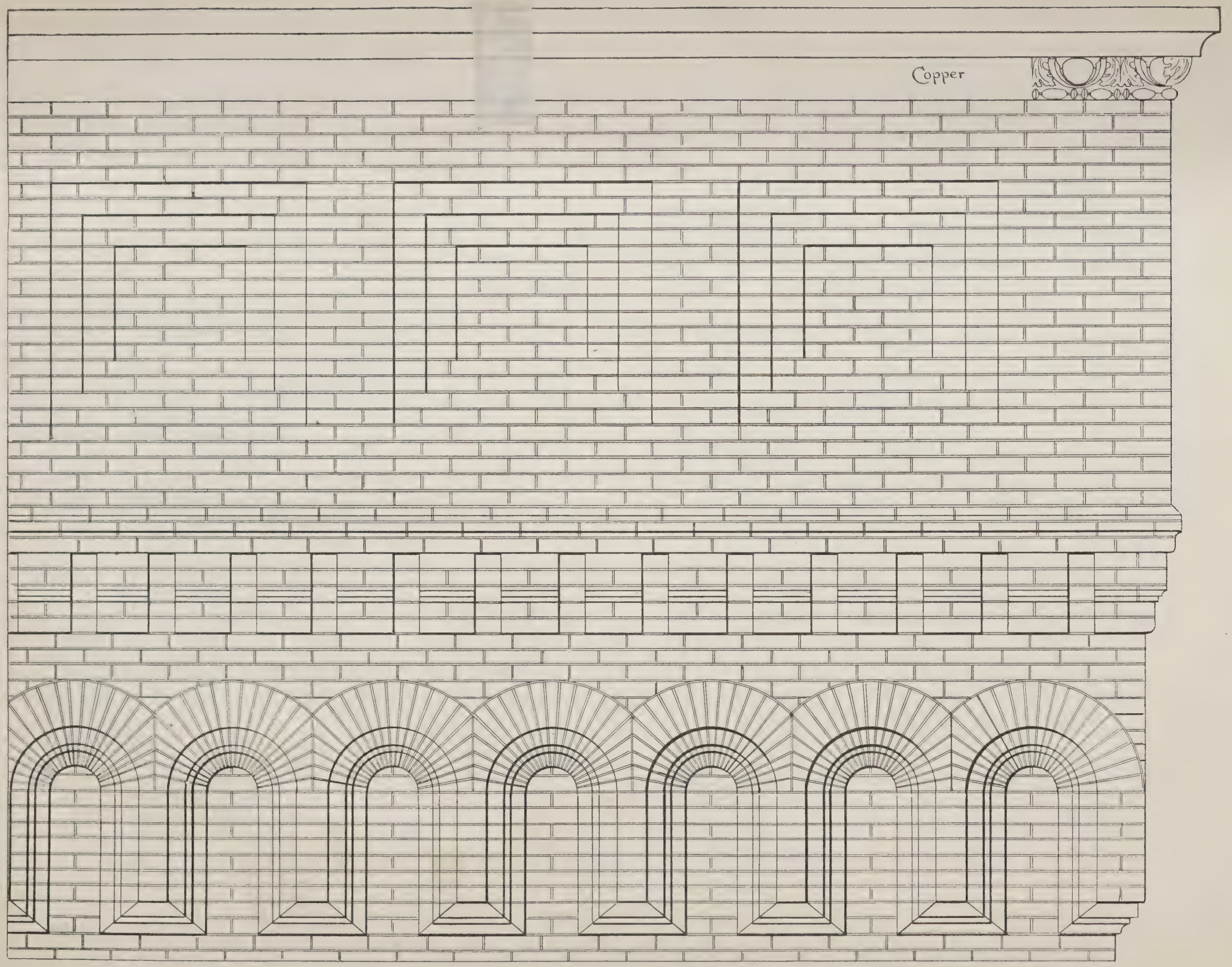
DESIGN BY HARRY C. WILKINSON, ("DAGO,") AUBURN, ME.



DESIGN BY JAMES C. GREEN, ("POTTER,") ST. LOUIS, MO.

COMPETITION FOR A FAIENCE MANTEL.

OFFERED BY FISKE, HOMES & CO., AND ATWOOD & GRUEBY, MAKERS, BOSTON.



"THREE-QUARTER INCH" DETAIL. CORNICE OF THE SHERIDAN CLUB, CHICAGO, ILL.

F. PARMENTIER, ARCHITECT, 86 WASHINGTON STREET, CHICAGO.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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SOME months ago we brought up the subject of better designs of ornamental bricks, and our remarks called forth a letter from Mr. Robert D. Andrews, of the firm of Andrews, Jaques & Rantoul, architects, suggesting that a competition be instituted under the management of the Boston Society of Architects, for a series of ornamental bricks that could become the common property of all makers who choose to use them. Mr. Andrews thought that possibly the brick manufacturers would be willing to offer the prizes, but we think that this suggestion is rather impracticable.

After all, the question arises whether we have any real need of ornamental bricks. Judging by the existing examples in this country, we should say that there are ten successful buildings where common bricks, with possibly two or three very simple moulded bricks, are used, to one where ornamental bricks have been largely used. Either architects do not care to use such bricks, or they cannot find any designs to satisfy them. If the former is the case, the sooner all ornamental work is left with the Terra Cotta men, the better. If the latter, however, is the reason, the remedy lies largely with the brick makers. They have only themselves to blame for the fact that their catalogues succeed only in thoroughly misrepresenting their stock. It is not our intention to be personal, but the point we wish to make is exactly illustrated in two catalogues of the N. Y. Anderson Pressed Brick Co. The earlier one was a "horrible example" of what the common wood engraver can do when he tries. The patterns, mostly geometrical, were portrayed with unpleasant and absolutely impossible precision. The immediate impression produced was one of hopelessness for any thing in the way of good detail with such designs. But the bricks were not so bad. Some, it is true, were pretty bad, considered individually, but one of the worst, so considered, has been used with charming effect in the Bay State Trust building on Park Square, Boston. Scarcely a pattern, that, skilfully used, will not produce the best of results.

A later catalogue changed everything. The photogravure process took the place of the wood engraver, and the bricks had some show. They were reproduced photographically and architects found there were greater possibilities than they had thought. Three or four companies have made improvement in catalogues but the rest are where they were years ago.

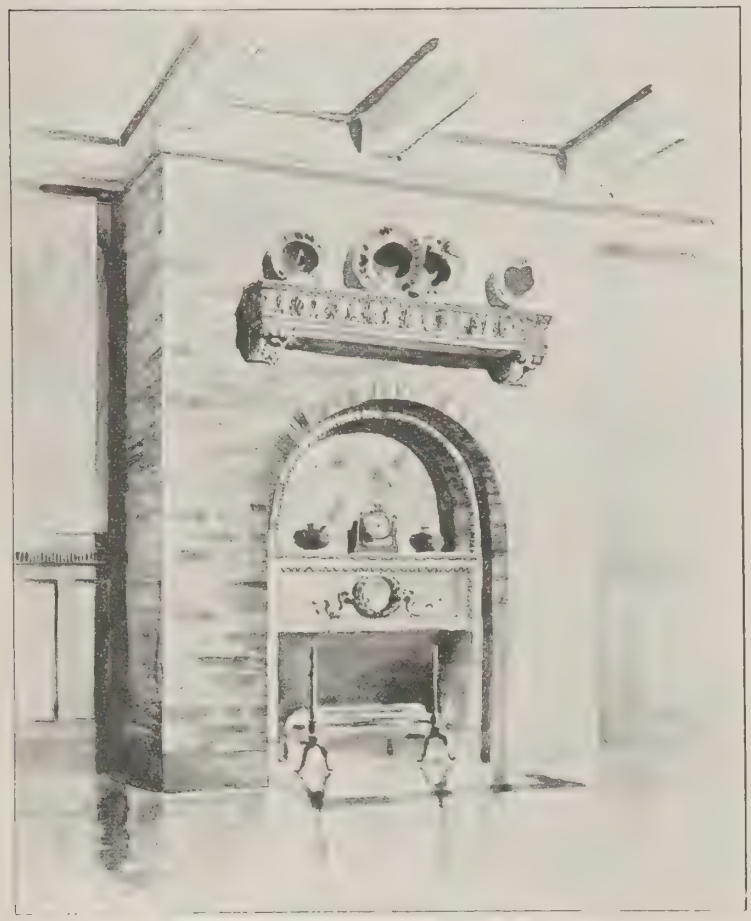
They are not doing half what they might do to favorably impress architects with their stock designs. All of these designs are meant to be used in combination. They are never seen in the building as they are in the catalogue or sample-room. Almost all architects realize this, but the first impression of the ordinary brick catalogue is so unfavorable that they seldom overcome it enough to give proper consideration to what the bricks illustrated really are, and how they can be used to advantage. The brick maker, on the other hand, looks at the individual brick; it is the whole story. His attention is taken up by its mechanical perfection, and he thereby shows himself a good brick *maker*, but a very poor brick *seller*. To successfully dispose of his stock he must look beyond and consider other views than those of the mechanic.

IN the English *Builder* for Dec. 31 there is a beautiful drawing of Mr. A. N. Prentice's of the doorway of the convent of San Pablo at Seville, which is noteworthy not only as a beautiful example of mediæval brick design, but as a model of the true way in which to use brick and glazed or enamelled terra-cotta for the production of the best color effect. The walls are kept plain, and the color is concentrated about the door. The joints of the door and inner rings of the arch are of alternate yellow and red brick in one and one half inch courses — about the size therefore of our so-called Pompeiian brick. The archivolt is decorated with a wide band of enamelled terra-cotta of a white and blue pattern on an orange colored ground, in which several medallions of figure subjects are introduced, treated in the manner of the Della Robbias, *i. e.*, with white figures in relief on a blue ground and only a sparing use of other colors. This concentration of bright color about certain definite points of interest in a design, such as the doorway, relieved on a ground of quiet color, with only slight echoes of the bright color in the other parts of the design, is the surest way to success in color treatment in brick and glazed terra-cotta.

THE advantages of the system of laying bricks known as "English bond" over that usually followed in this country have several times been pointed out in these columns. It has been shown that running bond is comparatively weak, whatever may be said as to its appearance. It is difficult to state exactly how much stronger English bond is, but 25 per cent would probably be a low estimate.

While it is doubtless impossible to persuade architects and builders to change their methods of construction at once, it is to be hoped that they will eventually take into consideration this disregard for strength and at least

adopt English bond for work below the ground line. All the criticisms that have been made upon the English system may be summed up in the word, appearance — the question of strength is generally conceded. Objections as to appearance obviously do not apply to work that is out of sight, and we hope, therefore, that in writing specifications architects will insist upon English bond being used for footings and foundations and all other brickwork that is not exposed to view.



PERSPECTIVE SKETCH OF FAIENCE MANTEL.
By James C. Green.

BRICK BUILDING IN DENVER, COLO.

Denver, Colorado, is pre-eminently a city of brick and stone, as no wooden building has been built within the city limits within the past five years, and at present, no building can be built within the boundaries of the city (measuring four miles from east to west, and five and a quarter miles from north to south), with wooden walls, and no out-house, coal-shed or stable can be built of wood, not even an enclosed porch. So far as the writer is informed, this is the only city in the country which does not permit the erection of frame dwellings in the suburbs. Wooden gables are permitted, and shingled roofs, and open wooden porches.

I suppose the reason that such a stringent building regulation has been allowed to stand, is that it is nearly as cheap to build of brick as of wood, taking into account the cost of painting, and as most owners prefer a brick and stone house to one of wood at the same price, there has been no opposition to the law except on the part of the architects, who would like to see a little more diversity in our architecture.

The climate of Colorado being exceedingly dry (at this date, March 22, we have had no rain for four months and but little snow), it is necessary to take extra precautions against fire, and hence brick buildings are preferred to frame on this account. There is also one other condition here, which reduces the cost of brick buildings, viz., that the ground is not affected by frost, so that a brick building may be built directly upon the top of the ground (merely scraping away the grass-roots), without cracking or settling. But should the ground get thoroughly wet under the walls, it would settle and cause cracks in the building, particularly under wide window openings. The ground here when dry is very hard, but when wet it becomes soft and compressible. No foundations being required for small cottages it is customary to have only a small cellar, under one corner of the house, and it is cheaper to build a cottage of five or six rooms all on the ground floor, than it is to make it smaller on the ground and have part of the rooms in the second story.

Two-story houses generally have a cellar under nearly all of the house, and the building laws require that all walls shall start at least two feet below the surface of the ground.

VARIETIES OF BRICK.

The common brick used here are made by mixing the ordinary prairie soil, which is a sort of yellow loam, composed of sand and clay, with coal dust, and moulding by hand, after which they are burned in the usual way. These brick have no metallic ring, and are very soft, except the bench brick which are melted in burning and hence are very hard, but they are also very brittle. I doubt if a twelve-inch pier of our common brick would carry as great a load as a nine-inch pier of New England brick. There is now a company which manufactures a stiff mud brick, end cut with the Chambers machine, which makes a very good common brick. For heavy and high buildings, culled pressed brick are used for the common brick work.

STOCK BRICK.

Until within about four years, but two kinds of brick were manufactured in Denver — common brick and *stock* brick. The latter were made of the same material as the common brick, and of the same size, but with more care, and were used for the outside face. They are much inferior to pressed brick, and are no stronger than the ordinary common brick.

Within four years, three large pressed brick manufactories have been started — one in Denver, the second at Golden, and the third at Boulder; all of which make a very good quality of pressed brick. These brick are made from clay and have a good ring to

them. The natural color of brick made from this clay is a light red, and coloring matter is added to produce darker shades. Very good fire clay is found near Denver, and this mixed with the common clay in varying proportions produces all shades from buff to white. Thus far the writer has seen no Colorado bricks which quite equal the Kansas City or St. Louis bricks in compactness and fineness of texture, and it is almost impossible to get the rich, dark shades found in those bricks.

The freight charges on Kansas City or St. Louis bricks is nearly equal to the cost of the bricks, which gives the Colorado manufacturers a great advantage, so that only a few of the large business blocks are now built of brick brought from outside the State.

MOULDED BRICK.

The Golden pressed brick company makes some dozen different designs of moulded brick, and the other two companies make two or three patterns; but the variety of moulded brick kept in stock here is very limited, so that the architects are unable to produce those artistic effects in moulded brick which are now within the reach of the eastern architects. As the population of the west increases, more capital will undoubtedly be put into the brick industry, and this deficiency will be supplied.

BRICK LAYING

is done differently here from what it is in New England. All brick are laid from the inside, no scaffolding being built on the outside of the building. There are very good pressed brick layers in Denver, and some very good work can be seen. Pressed brick are almost invariably laid with plumb bond, and diagonal headers. Common brick work is much more poorly done than in the east. Work which is not supervised by an architect, generally has but very little mortar in the inside of the walls, no slushing of the joints being done at all. Brick work is figured at so small a margin of profit that it is almost impossible to get first-class work without having a superintendent on the building all of the time.

THE SIZE OF THE BRICK

is larger than those made in the east. Common brick measure $8\frac{5}{8} \times 4\frac{1}{8} \times 2\frac{1}{2}$ inches; stock brick, $8\frac{1}{2} \times 4 \times 2\frac{1}{2}$ inches, and the pressed brick vary from $8\frac{3}{16} \times 4 \times 2\frac{3}{8}$ to $8\frac{3}{8} \times 4 \times 2\frac{1}{2}$ inches. Five courses of common brick average 14 inches laid in the wall, and the thickness of the walls are 9 inches, 13 inches, 17 inches, 22 inches, etc.

IN FIGURING BRICK WORK,

however, it is the custom to allow $22\frac{1}{2}$ brick to one square foot of a 12 inch wall, and in the same proportion for other thicknesses, and no allowance is made for openings less than 100 square feet in area.

COST OF BRICK WORK.

At the present time common brick work is figured at from $7.50 to $9 per M. *laid in the wall.* The average cost of common brick, delivered at the building is $5.75 per M. Stock brick cost $7.75 and pressed brick vary from $17 to $32 per M. for red brick, and $37 for colored brick, and Roman tile.

STRENGTH OF DENVER BRICK.

I know of no tests that have been made of brick piers built of Denver brick; but from experience, and a general knowledge of the strength of brick piers, I should not consider our ordinary brick work safe for more than eight tons per square foot, and for the very hardest brick in Portland cement mortar, I should consider $12\frac{1}{2}$ tons per square foot as the maximum safe load. Some of the pressed brick made here have been tested with a breaking load of 4,000 pounds to the square inch. The thickness of brick walls required by the building ordinance is shown by the following table:

THICKNESS OF OUTSIDE AND PARTY WALLS IN INCHES. FOR DWELLINGS.

Height of Building.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.
One Story	13	8					
Two Stories	13	13	8				
Three Stories	17	13	13	13			
Four Stories	22	17	13	13	13		
Five Stories	22	17	17	13	13	13	
Six Stories	26	22	22	17	13	13	13

FOR BUSINESS BUILDINGS.

One Story	13	8					
Two Stories	17	13	13				
Three Stories	22	17	13	13			
Four Stories	26	22	17	13	13		
Five Stories	26	22	17	17	13	13	
Six Stories	30	26	22	22	17	17	13

MORTARS.

Mortar for laying brick is made generally of white or gray lime. The white lime is now brought mostly from Missouri, as it is of a much better quality than any thus far found in Colorado. It is sold in the lump state, and never put up in casks.

The gray lime looks like a clay rock, being about the color of Rosendale cement, and it also comes in lumps. It slakes readily without any waste, and will harden under water. It is much stronger than ordinary white lime, and it is believed, in time, becomes fully as strong as the Rosendale cements, but it is much slower in setting and hardening. It is generally used in foundations and in the inside walls of heavy buildings. The best gray lime comes from Canon City, Colo. A very good quality of Portland cement is made in Denver, which compares very favorably with the imported article. For cheaper cements, Louisville and Utica cements are generally used.

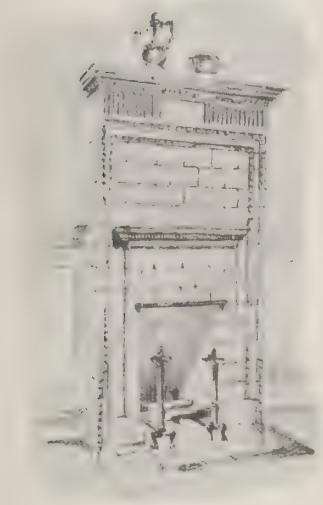
F. E. Kidder.

COMPETITIONS.

RULES: All drawings must be sent in marked with some motto or device and accompanied by a sealed envelope marked with the same, containing the full address of the competitor. The designs are judged by a committee of well-known architects, solely upon their merits, the names of the designers remaining unknown until the award is made, when the sealed envelopes corresponding to the devices on the designs are opened. To protect the interests of our advertising patrons it is stipulated that no ornamental bricks not found in their catalogues shall be used. This is really no restriction, for practically all of the leading manufacturers will be found represented in THE BRICKBUILDER. To encourage the study of effective use of the commoner materials, of two designs equally good, preference will be given that showing a skilful use of ordinary bricks to secure ornamental effect.

COMPETITION NO. 10.

DESIGN FOR A FAIENCE MANTEL.



By C. J. VIERHEILIG.

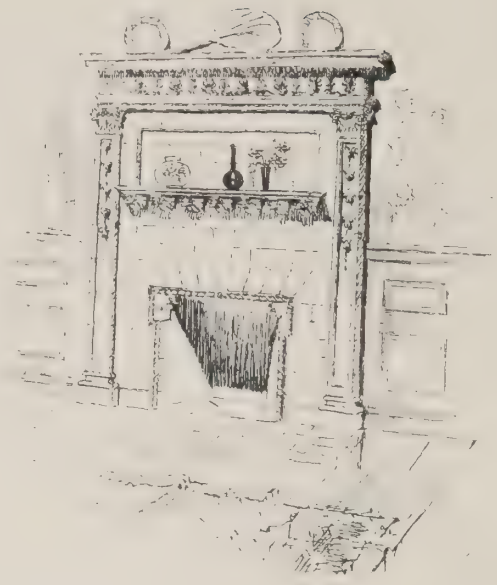
Four prizes of Ten Dollars each awarded by Fiske, Homes & Co., and Atwood & Grueby, of Boston, makers Architectural Faience, to the following:

"Horace"; Charles D. Maginnis, Boston, Mass. (plate 17). "Ictinus"; W. T. S. Hoyt, Boston, Mass. (plate 17). "Jim"; Charles G. Bachmann, Philadelphia (plate 18). Maltese Cross; Herbert E. Streeter, Jr., Boston, Mass. (plate 19).

Three Prizes of Five Dollars each awarded by *The Brickbuilder*, to "Jag"; Christian G. Vierheilig, Grand Rapids, Mich. (plate 22), "Hic"; W. Hirsch, Chicago, Ill. (plate 22), "Dago"; Harry C. Wilkinson, Auburn, Me. (plate 23). The design by "Potter," mentioned by the jury, published on plate 23, with a perspective on page 25 is by James C. Green, of St. Louis.

REPORT OF THE JURY.

It would seem that instinctively a designer would feel the first principle of design to be the treatment of an object with regard to the character of the material of which it is made, its purpose, etc. So that when a design for a faience mantel is called for, something characteristic of the glazed plates of earthenware of which the work is to be built, ought to appear in the result. Many of the thirty-five designs submitted in the tenth BRICKBUILDER competition for a faience mantel might just as well have been built of wood or moulded bricks, and some of cast iron.



By H. E. STREETER, Jr.

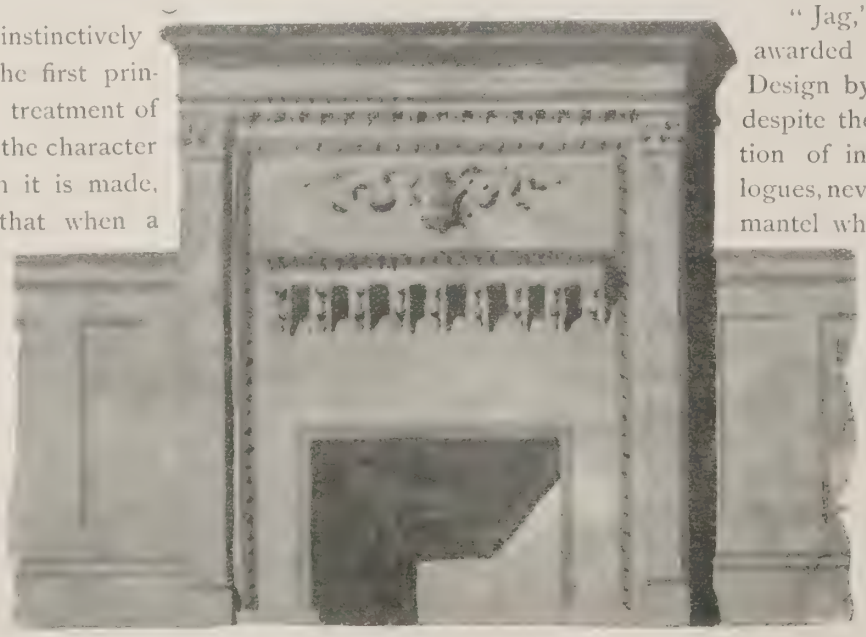
"Horace" submits a small outline drawing in elevation of a design, which, if properly carried out, would make a good faience mantel. The drawing is weak, and a perspective would have shown its possibilities better. The shelf is not broad nor heavy enough, and consoles under it are weak, and letters on frieze too large. He evidently does not think that brilliant draftsmanship makes a good design. "Ictinus" treats his mantel properly, like modelled and glazed material, but it is poorly and roughly drawn in soft pencil in a way which might easily prejudice one against it.

"Jim's" design is broad in treatment and well drawn. It has the defect of having the voussoirs of fire-place arch too deep; had they been cut off on a line with the bottom of the consoles and the top central recess above the shelf been elliptical rather than a flattened round arch, it would have made a good design, perhaps the best submitted.

Design by "Maltese cross in square" is good, but errs in being quite like woodwork. The drawings are quite good compared with the standard obtaining in this competition.

The above are awarded the prize of $10 each.

"Jag," "Hic," and "Dago" are awarded a prize of $5 each. Design by "Jag" is quite sober, despite the name. It has a suggestion of intimacy with brick catalogues, nevertheless it would make a mantel which would wear "well," as it is strictly architectural and simple in its composition and treatment of decoration. Design by "Hic" is somewhat similar to that submitted by "Maltese cross and square;" in rendering it is somewhat like that by "Jag," and is possibly his brother, as his name seems to indicate.



DESIGN BY W. A. HIRSCH.

The design by "Potter" is the most ambitious of those submitted, and the perspective sketch is the most brilliant piece of rendering in the collection, but it has a certain pretentiousness of design and an absence of rational composition which inspire one with a use of complicated and involved phrase in criticising it. It could be executed by about three times the specified amount.

"Dago" is not Italian in spirit, and errs toward the commonplace, but good, in that it is quiet and unobtrusive, quite the opposite of the design by "Potter." Some designs are submitted on tracing cloth, and all methods of rendering known, both color and black and white are represented. In all of them the rendering is better than the design. The drawing is never executed, but the design — the thought is.

J. A. SCHWEINFURTH.

Of the spring catalogues, two issued by J. W. Penfield & Son, of Willoughby, O., are models of straightforward, business-like trade catalogues. One is devoted to brick-yard supplies, and should be in the hands of every one owning or managing a brick-yard of any sort. The other is of particular interest to makers of pressed and ornamental brick, and is really a pamphlet full of information relating to re-pressing brick, rather than a catalogue. The method this firm has of cataloguing its goods is worthy of all extensive manufacturers. In place of one large catalogue, they issue a special complete catalogue of each class of goods. These catalogues, thus far, number eight, devoted to Auger Brick Machinery, Plunger Brick Machinery, Upright Stock Brick Machinery, Plunger Tile Machines, Clay Preparing and Handling Machinery, Brick-yard Supplies, Brick Pavements, and a condensed catalogue for busy brick-makers. Any catalogues are mailed free upon request.

The *American School Board Journal* brings to light a straight robbery by Canadian manufacturers of not only the cuts but the name of the well known "Willer" Sliding blind. There is absolutely no redress, and the Willer Manufacturing Co., whose name has been identified with sliding blinds since such things were known, and who have spent years and thousands of dollars in the development of their patent, must see their Canadian market appropriated without as much as saying "by your leave."

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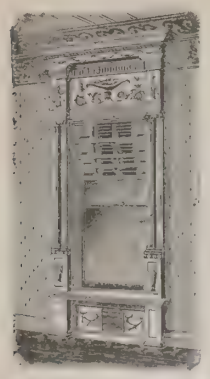

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ARCHITECTURAL TERRA-COTTA.

* * *

CATALOGUE AND ESTIMATES UPON APPLICATION.

* * *

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THE BRICKBUILDER

VOL. II. BOSTON, APRIL, 1893. No. 4.

ROOFING TILES.

WHY NOT HAVE MORE VARIETY?

From the British Clayworker.

IT is quite time that the attention of the manufacturers of clay goods was directed to the possibilities which are latent in the roofing tile. At present there is very little enterprise in this direction: manufacturers fail to see that it behooves them to create a desirable material for roofing buildings; architects and builders would soon use it, if they found that it presented superior attractions or advantages. That this is the case is evident from a consideration of the conditions or circumstances governing the use of any material used for building in a large town; some one has to show that a certain material can be obtained at a reasonable price, and that it is better suited to the requirements of the architect, either on account of its strength, durability, decorative qualities, etc., and at once a demand for it arises. If the manufacturers of roofing tiles would exhibit similar enterprise, there is no doubt they would find their efforts rewarded.

Apart from the lack of enterprise which too frequently limits the trade of the clay-worker, there is of course one great competitive material which has undoubtedly checked the development of the roofing tile in this country; we refer to the slate, which by reason of its cheapness, its uniformly good quality, and the ease with which it can be applied to a roof, has come into very general use. But no sanitary expert would place the slate before the tile; and in these days, when, in spite of the popular devotion to cheapness, people care a very great deal about the hygienic condition of their dwelling houses, we think there will be an increasing call for the terra-cotta roofing tiles. Slate roofs absorb and transmit a good deal of heat; terra-cotta tiles, on the other hand, act as non-conductors of heat, thus keeping the upper portion of a house warmer in winter and cooler in summer. In other respects, the tile compares favorably with the slate.

It has been stated that tiles are not so durable as slates, and hence the latter are preferred. This statement is partially true; some tiles are incapable of standing even one moderately hard frost! And why? Simply because they have not been properly burned. The average clay-worker seems to be under the impression that no more care is required to burn a tile than to burn a brick; but, owing to their being so much thinner, it is obvious that the same principles must not guide the burner in the case of both bricks and tiles. Great uniformity of temperature is required, and the tiles should be "set" in "bungs," or courses, of twelve (the direction being reversed with each bung, thus "twelve and twelve about") in that part of the kiln in which this uniformity can be best secured. For burning blue tiles, the circular oven is generally considered the best; but for the ordinary red or colored (not glazed) almost any kiln will give good results if the above precaution be observed. When drawing the kiln, the tiles should be "rung" as they are taken out, and the soft ones put aside for "setting" again when the next kiln is burned. A well-burned tile, free from cracks, or "lime-heaves," will stand the hardest frost quite as well as the soundest slate that can be procured.

The lack of hardness of which we have been speaking is probably one reason why architects, in districts where such rubbishy goods are made, prefer to specify slate for roofing. But manufacturers sometimes err in the selection of the clay; if it exist in the clay bank, there is nothing better than a sound, strong, yellow clay, free from ochre lumps and stones. Some marls, however, make good tiles if they are properly weathered; but it must be remembered that although dry summer weather disintegrates a layer of marl, frosty weather is infinitely preferable. Hence, with marls that need weathering, it is better to expose them all the winter so that the frost may get a good hold of them: such exposure makes the clay knead well, and gives it great cohesive power. The object of this process is of course to open the pores of the marl and to separate the particles, so that it may absorb water more readily, and may "mellow" more satisfactorily and become plastic. Weathered marl is never too strong for tile-making, but some kinds of surface clay, that contain little silica, prove too strong for this purpose; the fault may always be corrected, however, by a judicious mixture with clean, sharp sand before passing it through the mill. If the clay is too strong, the tiles will

twist. The occurrence of lime in clay is a very serious factor to be dealt with. It renders even the weathering of clay necessary, for however carefully such clay be milled, even though the rollers be brought so close as to strain the engine, the difficulty will assert itself in the finished goods. When weathering cannot be resorted to, closing the rollers and grinding the clay more than once will have some good effect; but we should strongly advise manufacturers never to allow a "lime-blown" tile to go out of procurable, architects would specify and builders use them in giving to our houses a much finer effect.

Generally speaking, we employ two classes of tile in this country, the flat tile, which is of German origin, and the pan tile, which was first introduced from Flanders. It is true that there are a few fancy tiles made, and that in certain districts the single and double Roman and triple tile are favored, but the houses of the United Kingdom are chiefly roofed with the pan tile and the flat tile. One

HOTEL LUDLOW, ST. JAMES AVENUE AND CLARENDON STREET, BOSTON.
MESSRS. WALKER & BEST, ARCHITECTS.

the yard. Five per cent of such tiles will be enough to give goods a bad name; for, if not before, these tiles will open with the first frost, and make any roof which they cover both unsightly and less durable. A use can always be found for such tiles in covering hacks, etc.

Having now lightly touched upon the chief reasons why tiles are not used more, or why they are in bad repute in some districts, we desire to call attention to some of the latent possibilities existing in the tile as an architectural material, believing that if suitable tiles were

would almost think that these are the only forms possible, but a visit to the South Kensington Museum would dispel such a delusion. Here a very great variety of roofing tiles may be seen. We wonder how many tile makers in this country have ever visited the Building Materials Department of our national museum. The architect, the metal-worker, the cabinet-maker, the wood-carver, indeed representatives of nearly all the handicrafts, may be seen at South Kensington almost any day, but especially on Saturday, eagerly studying the examples of the arts and manu-

factures which are collected and arranged there; but the officials have told us that they rarely see a brick or tile maker there studying the old types or the forms which are used to-day in other countries.

A glance at the catalogue is sufficient to show the scope of this collection, yet there it lies almost forgotten! What wonder, then, that the tile trade in this country is pervaded with old-fashioned notions, and that the roofs of our dwellings are tiled with the same material which the farmer uses for his cow-sheds and pig-sties!

In Italy, France, and Switzerland, "interlocking" principles, which are used to some extent in England, are chiefly employed. By a series of ribs and corresponding depressions a form of tile is devised which more thoroughly excludes the water. But tile-makers in these countries never lose sight of the decorative effect of a tile, consequently the roofs, even in manufacturing towns, are highly picturesque. Throughout Germany the flat tile is the common form, but the borders are so rounded, pointed, or escaloped, and the tiles so mounted, that elegant effects are produced. Builders there do not content themselves with a plain red or dun-colored roof; colored tiles are used which are often glazed to enhance their effect. Every one who has seen pictures or photographs of German towns, such as Nuremberg for example, will have observed how deftly the tile is handled in covering dormer windows, gable-ends, etc.

If we want to do an increased trade in tiles, we must produce durable and more attractive goods. By studying the types of tile that are in use in various European countries we may accumulate useful ideas which will help us in designing new goods for our own trade. It lies with us to develop the possibilities which exist in the tile as a material for covering roofs; such efforts will not remain unrecognized, for æsthetic notions are becoming more general, and even the jerry-builder has discovered that he must do his "jerrying" artistically. No branch of the trade affords so much argument in favor of what we are pressing upon the attention of our readers as the manufacture of moulded bricks and structural terra-cotta work. The bricks afford the best analogy. A few years ago brick-makers were satisfied to make a few bull-nosed or chamfered bricks, and the demand even for these was limited. But, owing to the enterprise of some of the more enlightened manufacturers, the architect and the builder were shown what could be done with moulded bricks of varied patterns, with the result that a large demand immediately sprang up for this class of goods. This case is "on all fours" with that of tiles; at present we are mostly content to manufacture a few forms which do not lend themselves much to the creation of beautiful architectural effects. Yet we could make beautiful tiles if we cared to, and eventually create a lucrative branch of business.

FOULKE & LONG INSTITUTE, PHILADELPHIA: MESSRS. COPE & STEWARDSON, ARCHITECTS.
BRICK AND TERRA-COTTA BY STEPHENS, ARMSTRONG & CONKLING. FOR DETAILS SEE PLATES 26 AND 27.

TERRA-COTTA AND FAIENCE AS MATERIALS FOR ARCHITECTURAL AND DECORATIVE APPLICATION.

THE Italian term "terra-cotta," by which a certain class of burnt clay or earth is technically known, at once points to the source from whence it derives its present characteristic features as an architectural material. In such relationship its general use dates from the period of the Italian Renaissance; but, historically, it was known and used in much earlier times.

In fact, it may be said to be prehistoric in its origin, for in many forms it is one of the few links, and in some cases almost our only link, with nations of the most remote antiquity. Both in the form of bricks and more elaborate constructive and decorative forms, it was evidently largely used by the earliest builders known to us who can lay claim to architectural skill.

The remains, fragmentary and otherwise, of both Nineveh and Babylon, as revealed by the researches of Layard, Rawlinson, and Porter, clearly reveal its application, and afford not a few specimens of historical, antiquarian, and also of architectural significance. Whether, in fact, the remains of the very earliest builders of whom we have record can or cannot be absolutely identified, we are, nevertheless, in the use of terra-cotta merely following in their wake, for we read of the men of the East, when migrating westward, that, "coming to the land of Shinar, they dwelt there, and said one to another, Let us make bricks and burn them thoroughly; and they had brick for stone." It is not my purpose, however, this evening, to touch upon the historical aspect of the subject, although it might well deserve, and would certainly repay, attentive consideration.

In incidentally alluding to the early authentic use of terra-cotta, I merely wish to remark that as an architectural material we have at least some ancient historical and not a few fragmentary testimonies to its value, and in considering its modern developments and uses it is not without significance to remember that we are not concerned with something new, but rather with the oldest composite and manufactured architectural material to which we have either historical or fragmentary reference.

That the burnt brick of the ancients is identical in material with the terra-cotta of to-day may seem at first a somewhat bold assertion, yet it is probable that it had a very close similarity to many varieties of so-called terra-cotta.

Burnt brick and terra-cotta are, as regards the nature of the material, synonymous terms. The former may be, and sometimes is, the coarser and rougher form, but not necessarily so, nor always by any means. Technically, we apply the term "brick" to forms of certain, or rather uncertain, dimensions and shape within recognized limits as to size, the maximum limit of size being generally that capable of being handled by one hand in the process of building; whilst the term "terra-cotta" is technically understood to refer to blocks exceeding this maximum, in form more resembling blocks of masonry, moulded in its plastic condition into the required shape and size, and applied architecturally on more or less the same principles of construction as are recognized for the use of stone blocks. This definition may be said to be of general application, but it may be remarked that since the introduction of machinery in making bricks a decided difference of process in the preparation of the raw material tends considerably to widen the distinction between terra-cotta and many classes of bricks. The manufacture of terra-cotta is essentially a plastic process. The manufacture of bricks is not now essentially or necessarily so, for in many districts the raw material is now treated in what is called the

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semi-plastic or the dry form, and worked into the required shape by mere force of compression, without any of the preparatory plastic treatment which gives to terra-cotta one of its principal qualifications as an architectural and artistic material. Although it is unquestionable that with certain shales and clays the dry or semi-plastic process of brick-making is capable of producing, and with suitable treatment does produce, bricks of excellent quality and hardness for building purposes at a very low rate of cost, yet, I think it will not be seriously contested, even by those interested in their production, that apart from the question of cost they are not entitled to rank with a suitable clay treated as a plastic material, and made into brick or terra-cotta, with due regard for the necessary qualities of a first-class building material. In our consideration of terra-cotta as a material for architectural and decorative use, within the limits at our disposal, I think I shall best serve your purpose by describing the nature and quality of the raw material.

The terra-cotta, the burnt brick of the ancients, was probably made of the rich clayey earth, or surface clay, of the alluvial plains, which, being plastic in its natural condition, was most easily susceptible of treatment with the simple appliances at their command. Varieties of the same alluvial formation are preferred in some districts and countries not only for the ease with which they are worked in the plastic form, but from their abundance and great accessibilities at a minimum cost.

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These surface clays were, however, in many respects the least desirable of the aluminous deposits available for terra-cotta. They preserve often, indeed, a high degree of plasticity, which is most desirable; but this valuable quality is often neutralized by an absence of strength, which renders them unsuitable for any purposes requiring exactness of form and shape, after exposure to even a low heat in process of burning. As a rule, these surface clays, being rich in alumina, and deficient in silica, are re-enforced in process of manufacture by the addition of sand and other silicious materials, and in some districts it would be impossible to treat the clay in any practical way without this or similar combination.

In not a few instances the material thus prepared is, however, only available for bricks burnt at a low heat either in clamps or ovens, and cannot take higher rank than a country-made common brick or a London stock brick. In other cases, by the addition of large proportions of sand, the tendency to twist and warp in burning is checked, but the product is often rendered very porous, and is deficient in the ring and hardness characteristic of a well-burnt brick material of a superior quality. The shales of the coal measures are in some instances used as a raw material for the manufacture of terra-cotta, but these also are often deficient in silica, and are also more or less in combination with other carbonaceous and deleterious substances. They require very skilful treatment to produce a terra-cotta of even moderate quality, and are, as a rule, deficient in the clearness of color characteristic of purer deposits of clay.

The natural clays most favorable to the production of the best terra-cotta are those in which silica and alumina bear a proportion of not less than about 60 parts of silica to 30 or 40 of alumina, with but little more than one or two parts of foreign material, chiefly ferruginous oxide. Such deposits are probably more plentiful than they are known to be, but the most important at present available are confined to limited areas, and are not numerous. They are of two or three varieties, viz.: 1st. The banks or pockets of red marls characteristic of some of the Midlands, Staffordshire, some parts of Cheshire, some parts of North Wales, some parts of Devonshire, with

here and there banks of marl similar in formation but with the coloring oxides more or less absent. These banks or beds are sometimes of considerable thickness, and present several varieties of clay. The thickest I know is in North Wales, and probably some hundreds of feet in total depth. It is a remarkably fine bed of red marl. 2d. Certain anhydrous strata of the coal measures, commonly known as fire-clays, a material com-

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posed of silica in varying proportions, from 60 up to 70 parts in the 100, and the rest of alumina, with but small admixture of foreign organic matter. These strata exist more or less throughout the entire area of the coal measures. But I think I shall not be guilty of undue partiality in stating what I believe is generally admitted by those best qualified to judge, that one of the purest strata of this clay hitherto worked in this country is in the Leeds district, and underlies the large area of what is known as the Low Moor or, better, bed-coal.

It lies at an average depth of (say) 60 yards below the surface, and is of an average thickness of about three feet. Having a considerable depth of cover, it is very hard and close in texture, and is got only by mining operations by the same methods as coal. An analysis of it indicates great refractile power, with almost perfect freedom from foreign matter or organic impurity. It is unquestionably a most excellent base, in connection with other material, for the production of terra-cotta in any form, from the simplest to the most elaborate, inasmuch as it secures: 1, the minimum of contraction in drying; 2, hardness and exactness of form when burnt; 3, solidity under pressure; 4, clearness of color. The clays of Dorsetshire have also been largely used for terra-cotta, and they are for the most part an excellent, clean and plastic material; but they are too deficient in silica to be used without considerable admixture. Although when in suitable combination they make excellent stone ware, and are invaluable to the potter, they are less desirable for architectural work. It will be inferred from what I have already stated that the question of suitable raw material for the production of first-class terra-cotta is by no means simple, and, in order to solve the matter satisfactorily, some manufacturers make from the clays of various districts what they consider to be the most suitable body. The London manufacturers, for instance, as well as some others, are compelled to rely entirely on clays from localities at a more or less considerable distance from the place of manufacture.

Although by judicious mixing it is no doubt possible to produce a thoroughly good and sound body, yet when the finer and more important proportions of the raw material are imported from considerable distances, often at a considerable expense, there is some danger (in these days of excessive competition) of the product suffering by a too sparing use of the most desirable constituents. I have incidentally alluded to the question of color; this is, however, a most important point in determining the value of a terra-cotta material for architectural purposes. The principal coloring matter is oxide of iron, present in one form or another in all genuine clays; but these oxides are very various in their quality and condition, and produce remarkably varying results under the action of fire. Some clay will develop by heat a rich deep red color, others a warm buff, and these again vary considerably according to the mode in which the heat is applied, or according to the amount of atmospheric oxygen admitted during the process of burning. The color qualification of each bed of clay can practically be determined only by experience, for although chemical analysis may indicate the actual quan-

SALMON TERRA-COTTA

IN HOTEL WALDORF, NEW YORK. H. J. HARDENBERG, ARCHITECT, NEW YORK. MADE BY STEPHENS, ARMSTRONG & CONKLING, 1341 ARCH STREET, PHILADELPHIA.

tity of iron oxide present, its effect is a matter of direct experiment. In some cases it is necessary to support the coloring properties of the clay by additional oxide; in other cases the oxide is present in too abundant degree, and has to be neutralized. — *The Building News.*

(*To be continued.*)

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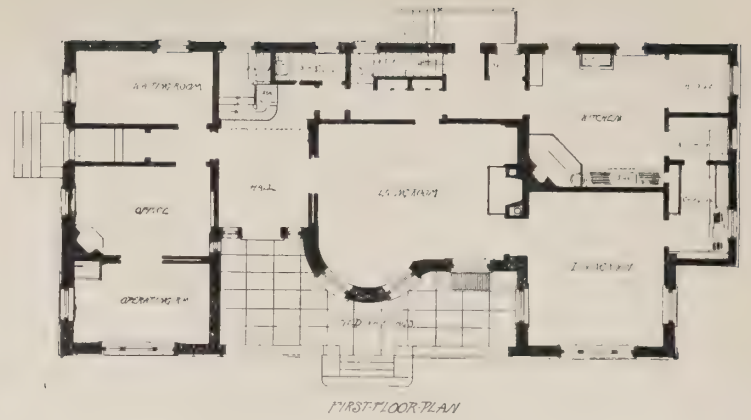
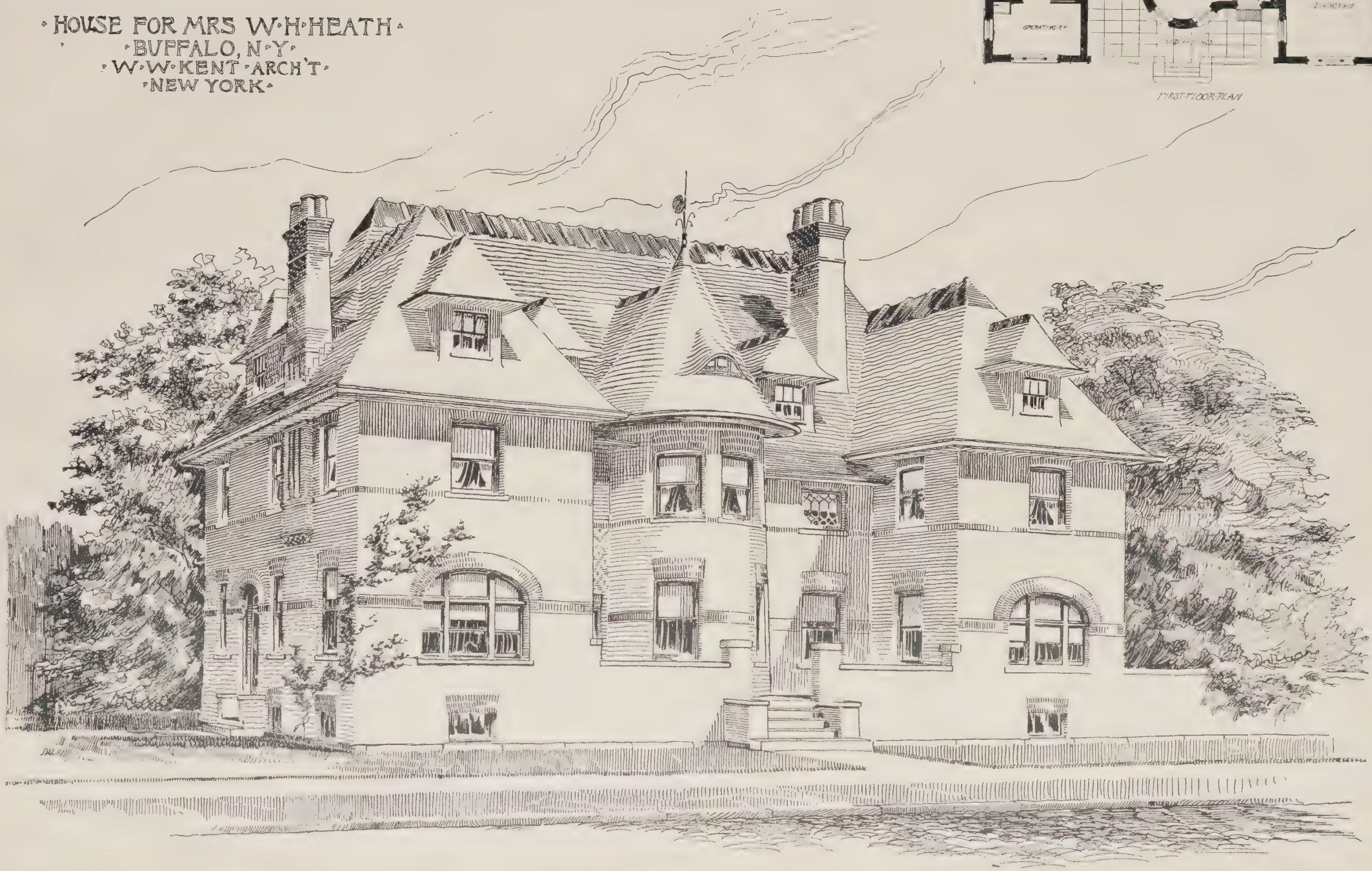
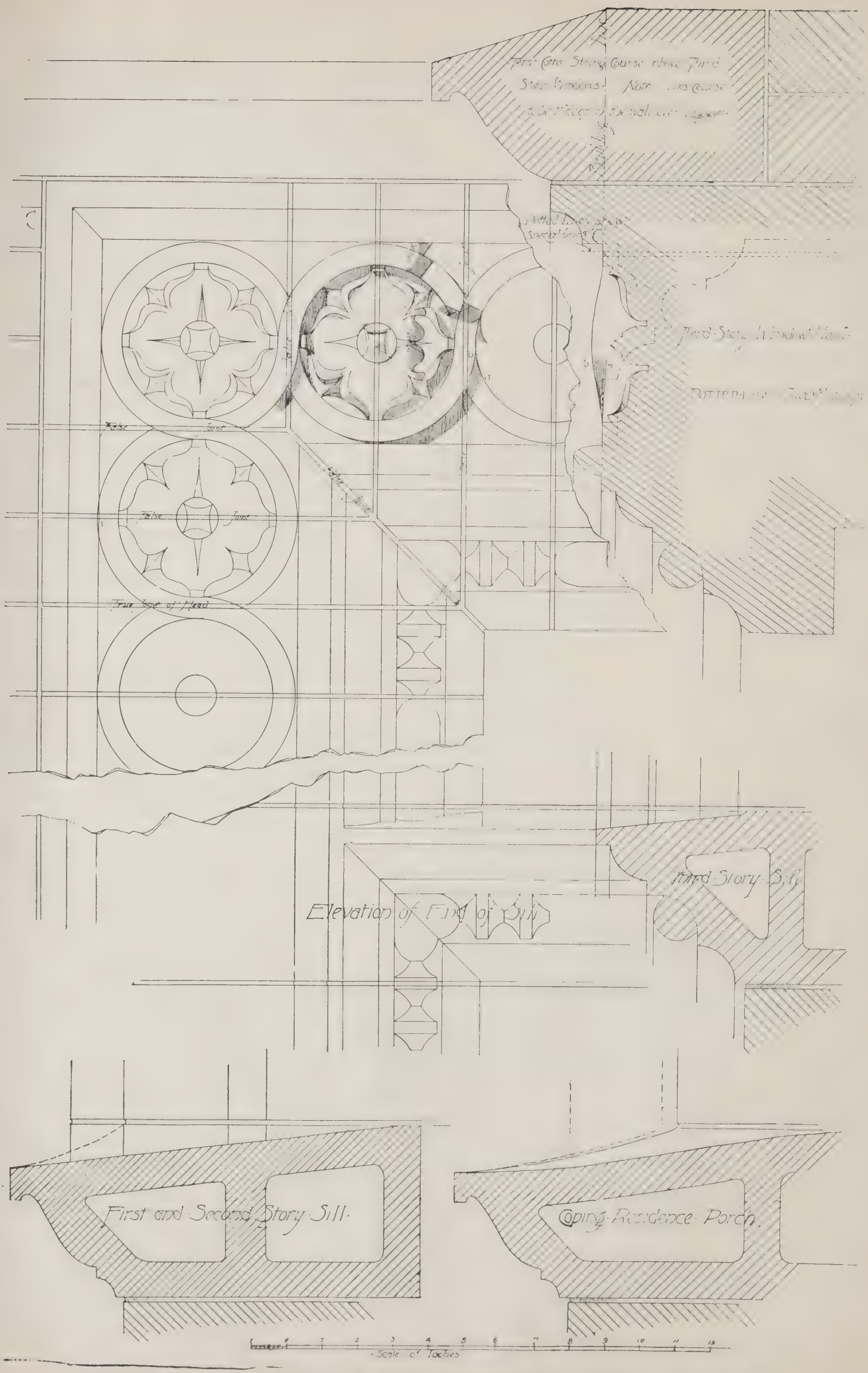
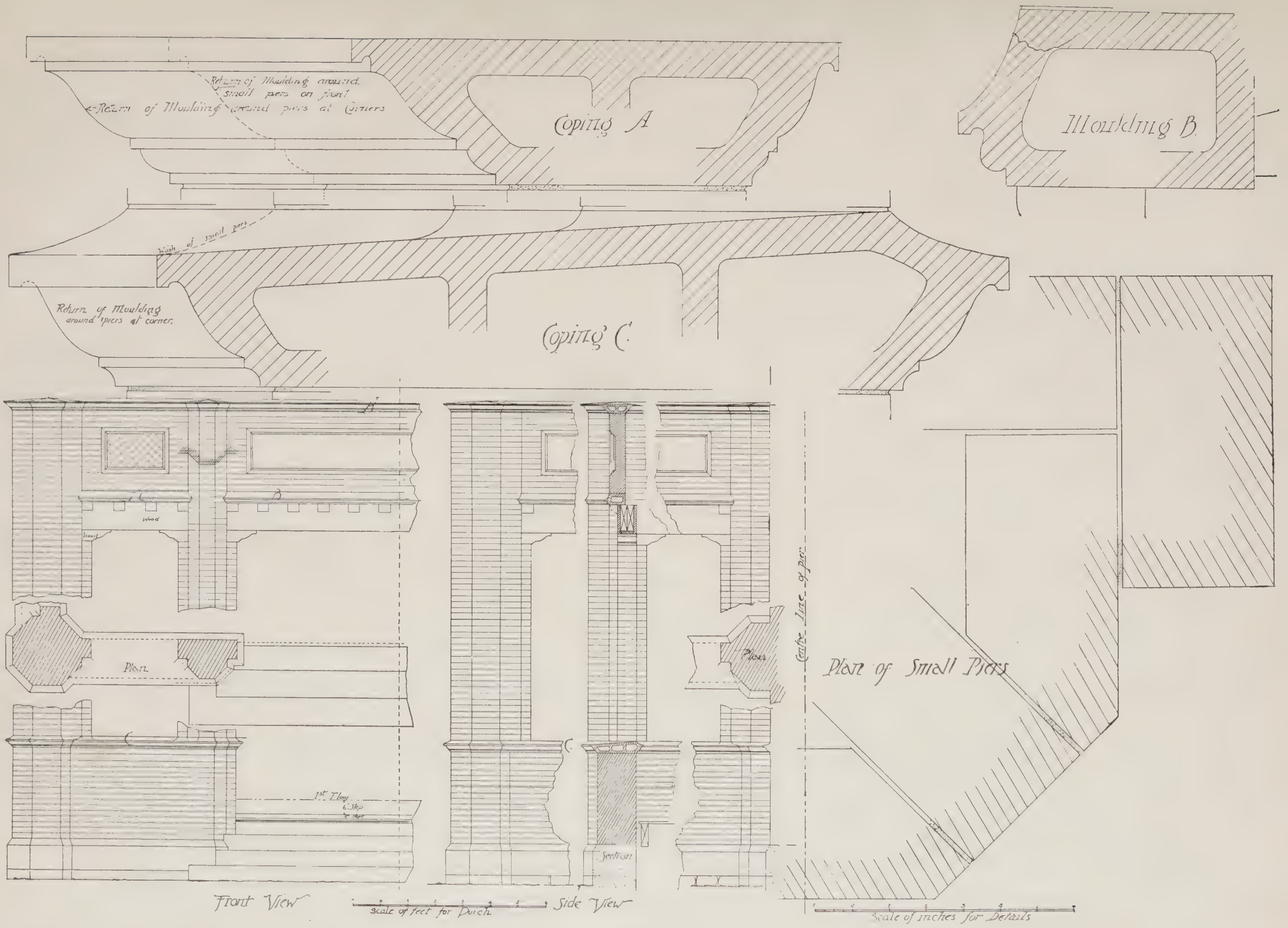
W·W·KENT·ARCH'T·
NEW YORK





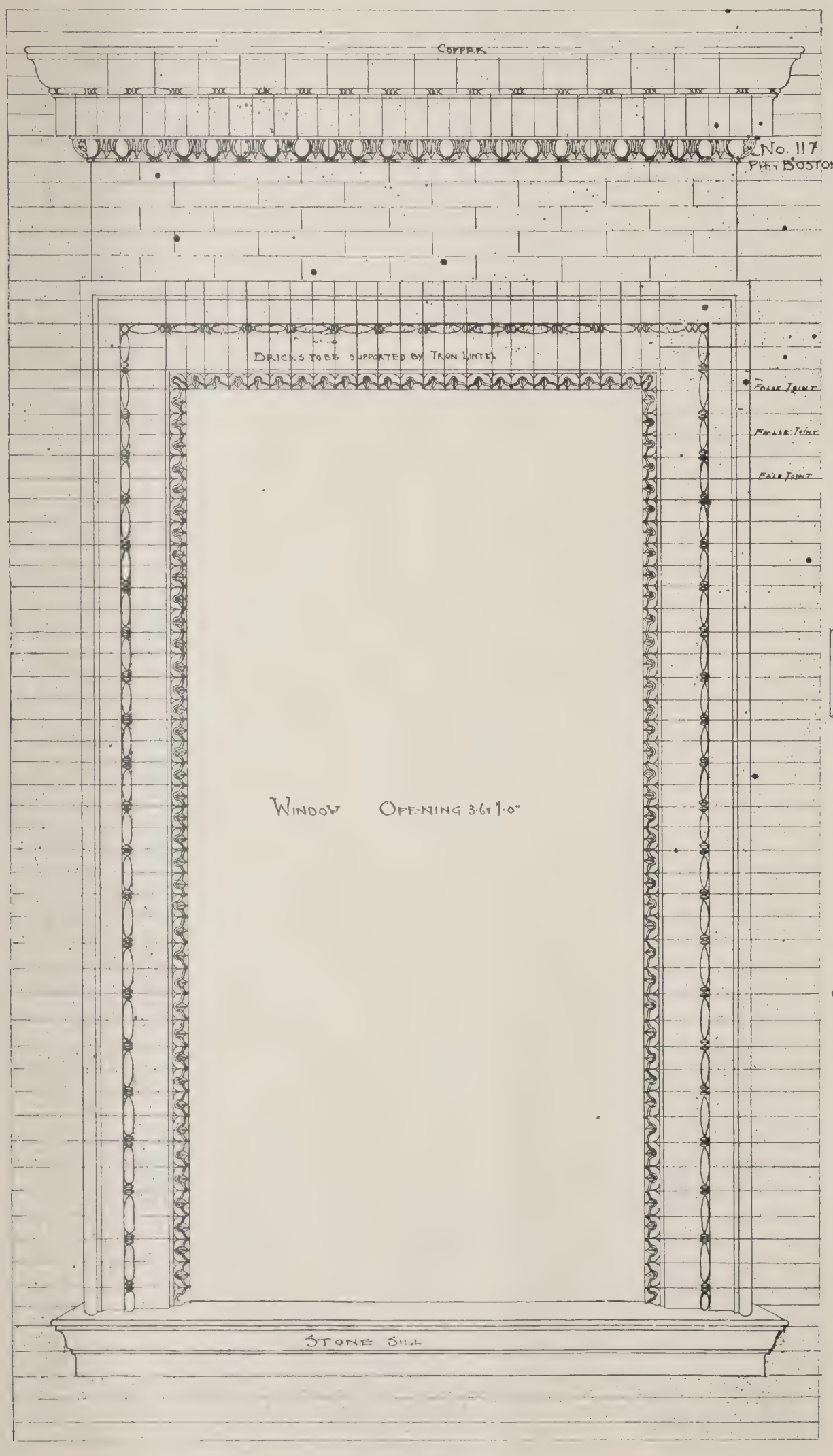


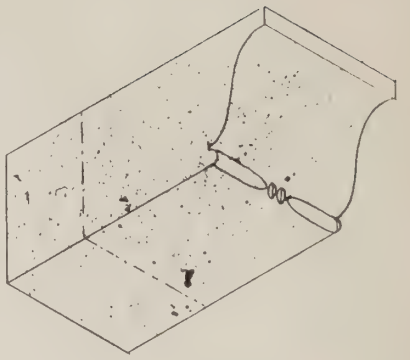
TERRA-COTTA DETAILS, FOULKE & LONG INSTITUTE, PHILADELPHIA. (See page 33.)
MESSRS. COPE & STEWARDSON, ARCHITECTS.

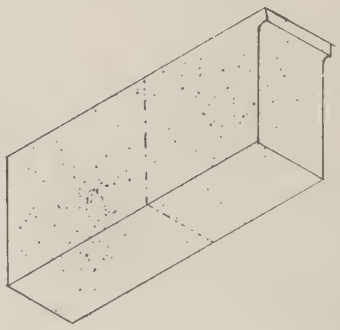


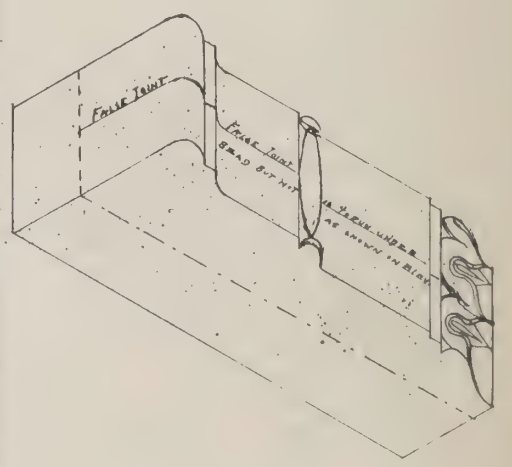
DETAILS OF PORCH, FOULKE & LONG INSTITUTE, PHILADELPHIA. (See page 33.)

MESSRS. COPE & STEWARDSON, ARCHITECTS.







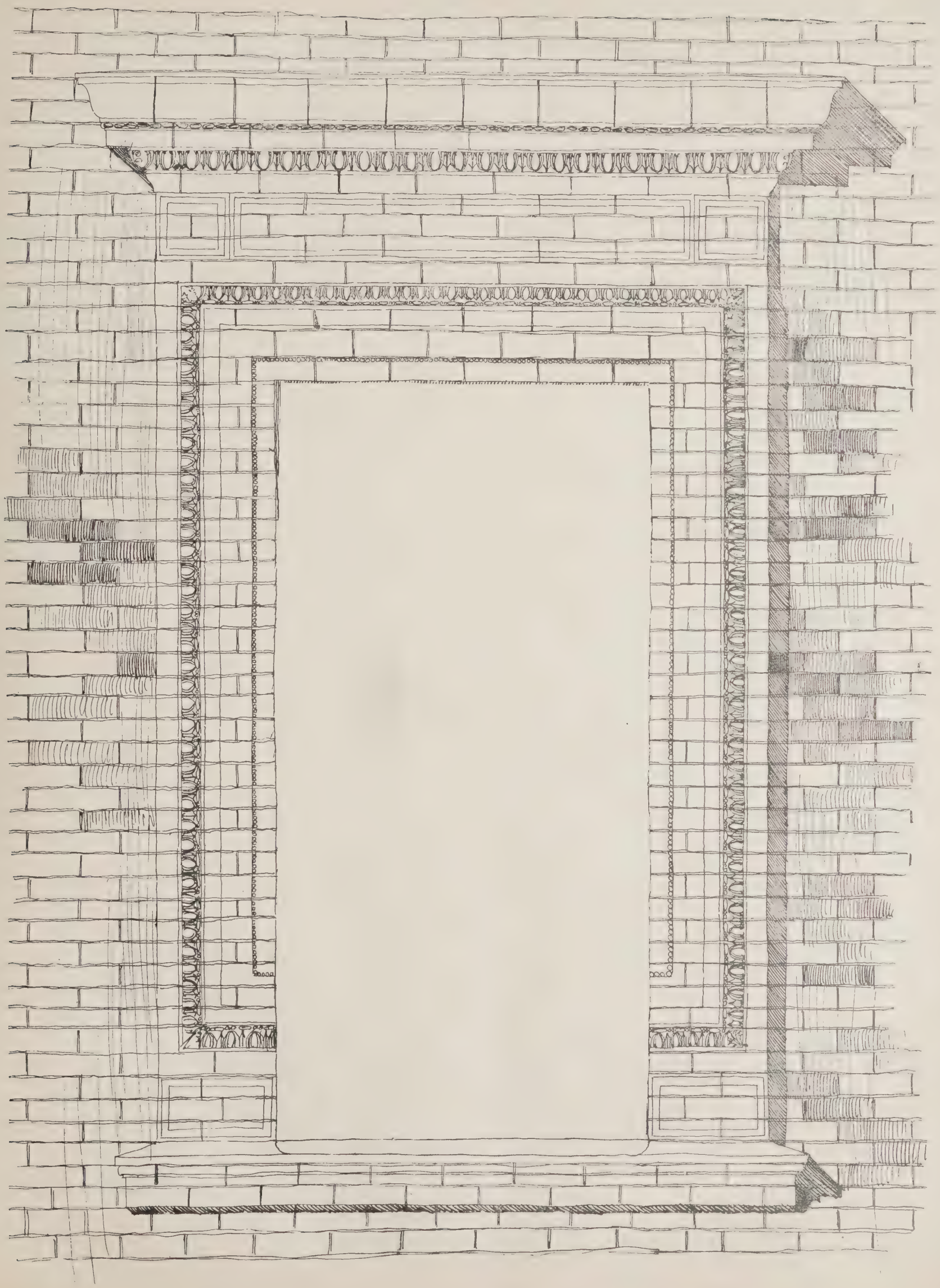


ISOMETRICAL DRAWINGS OF MOULDED BRICK FOR A WINDOW OPENING

SCALE 3 INCH PER FOOT.

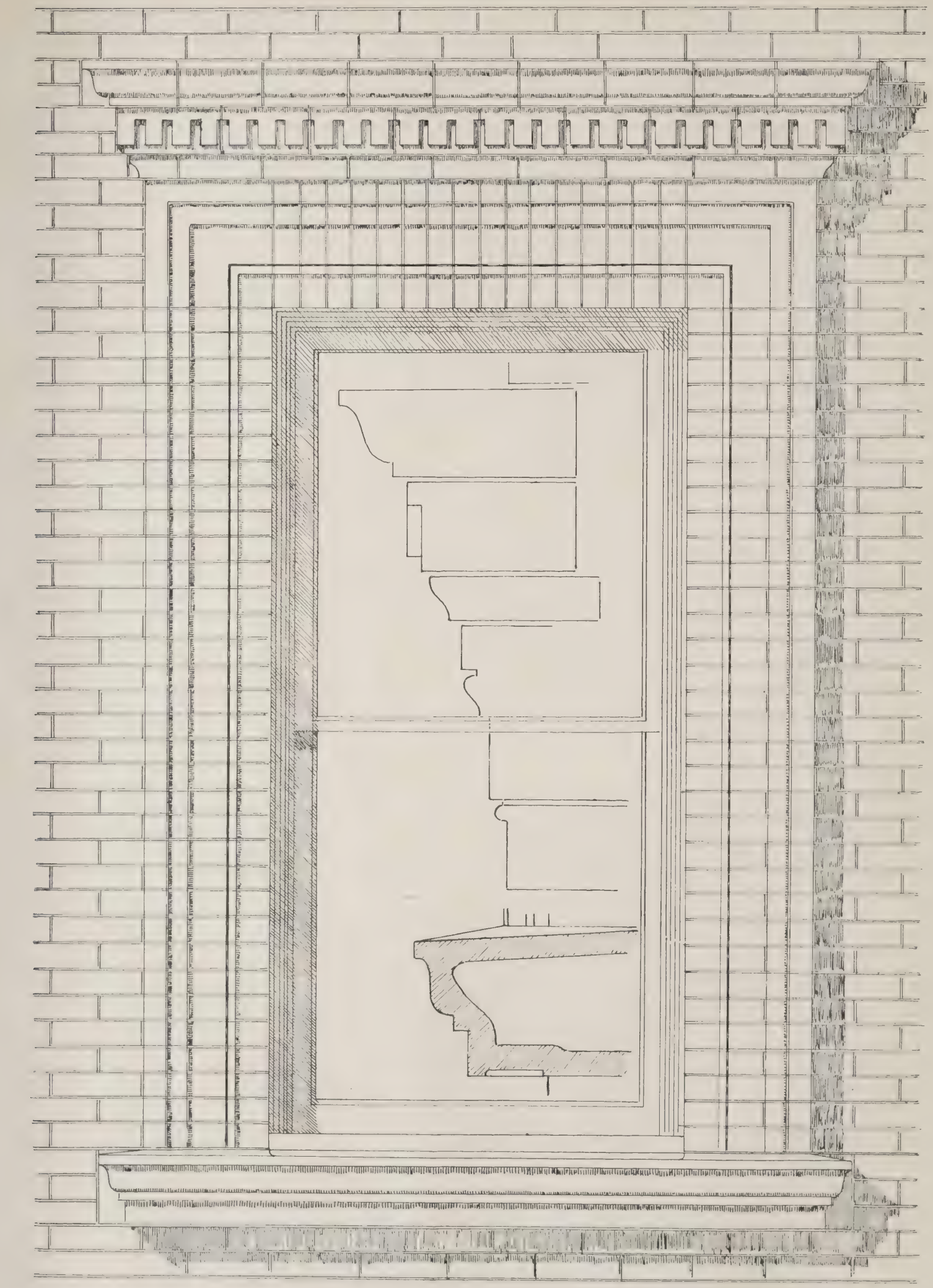
MINNESOTA CHAPTER, A. I. A. DRAUGHTSMEN'S COMPETITION. PROBLEM I.

FIRST MENTION. MAX FOCSTER.



MINNESOTA CHAPTER, A. I. A. DRAUGHTSMEN'S COMPETITION. PROBLEM I.

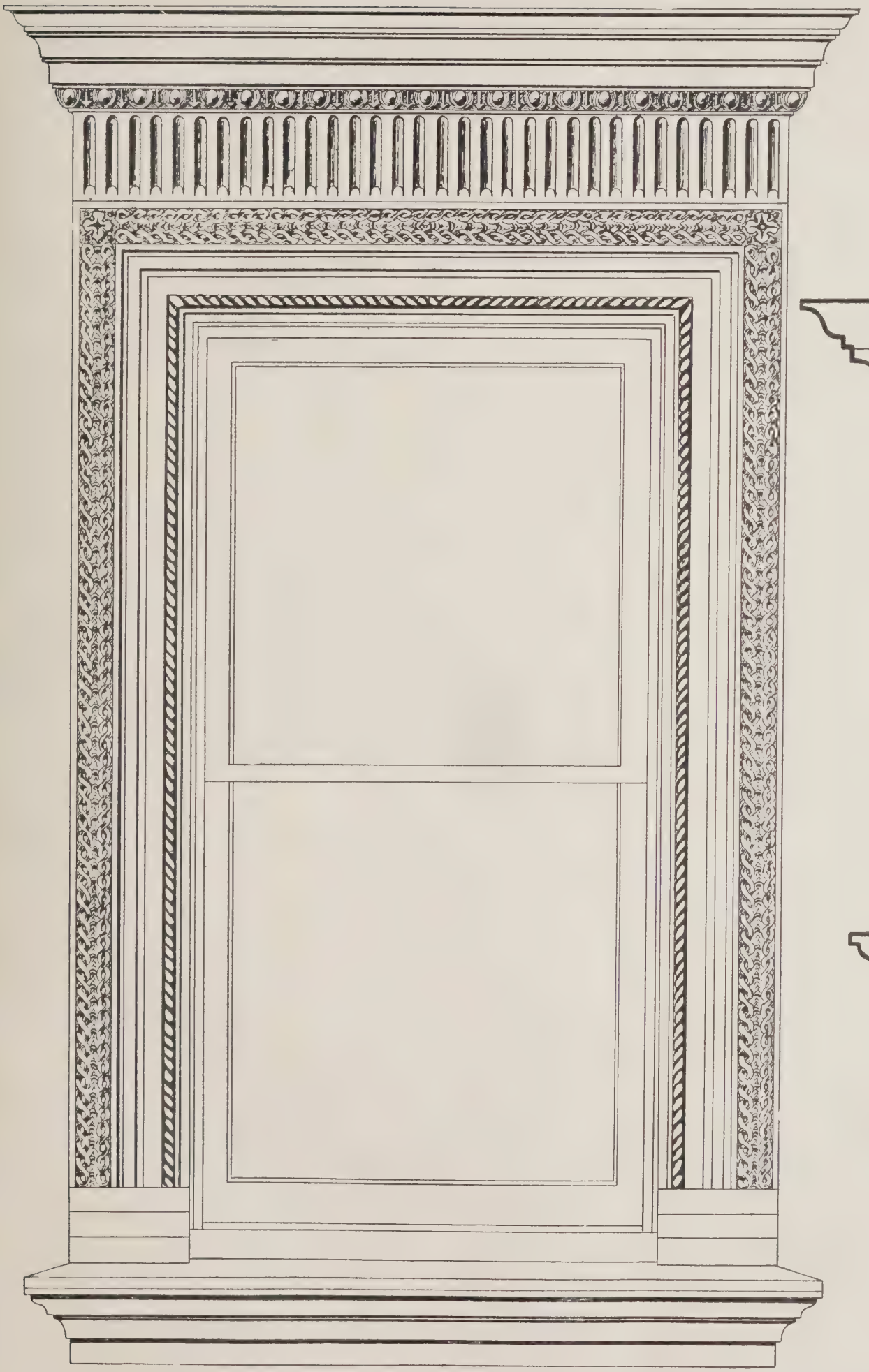
SECOND MENTION. JNO. RACHAC, JR.

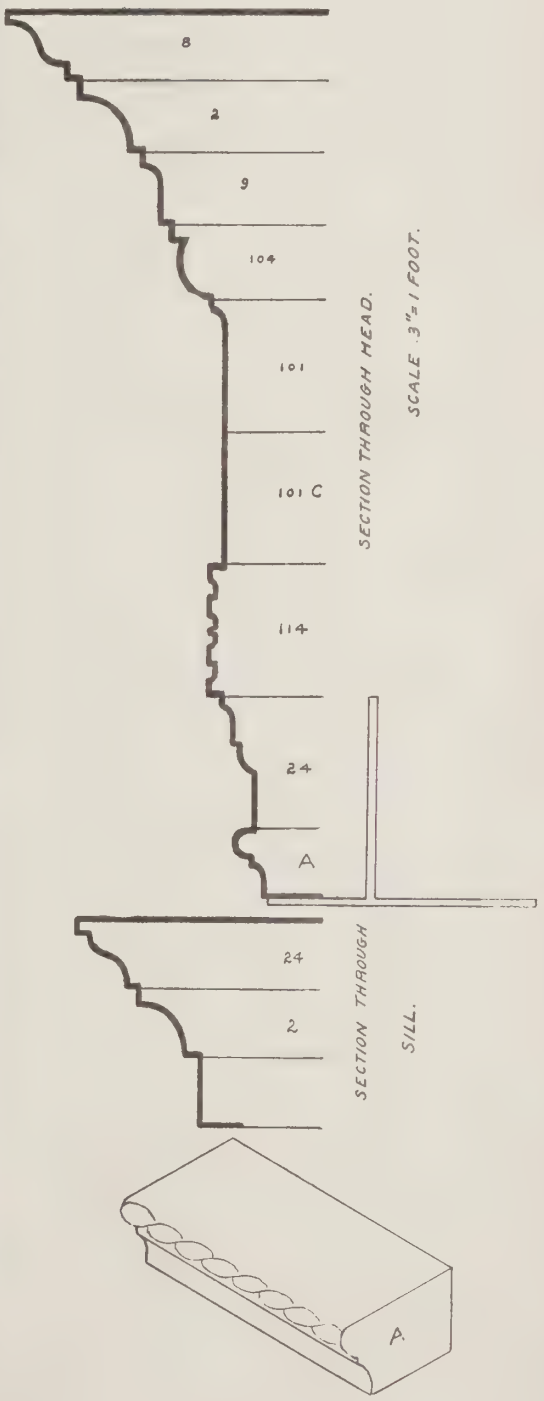


JANUARY PROBLEM
BY
CHARLES AUGUSTUS

MINNESOTA CHAPTER, A. I. A.

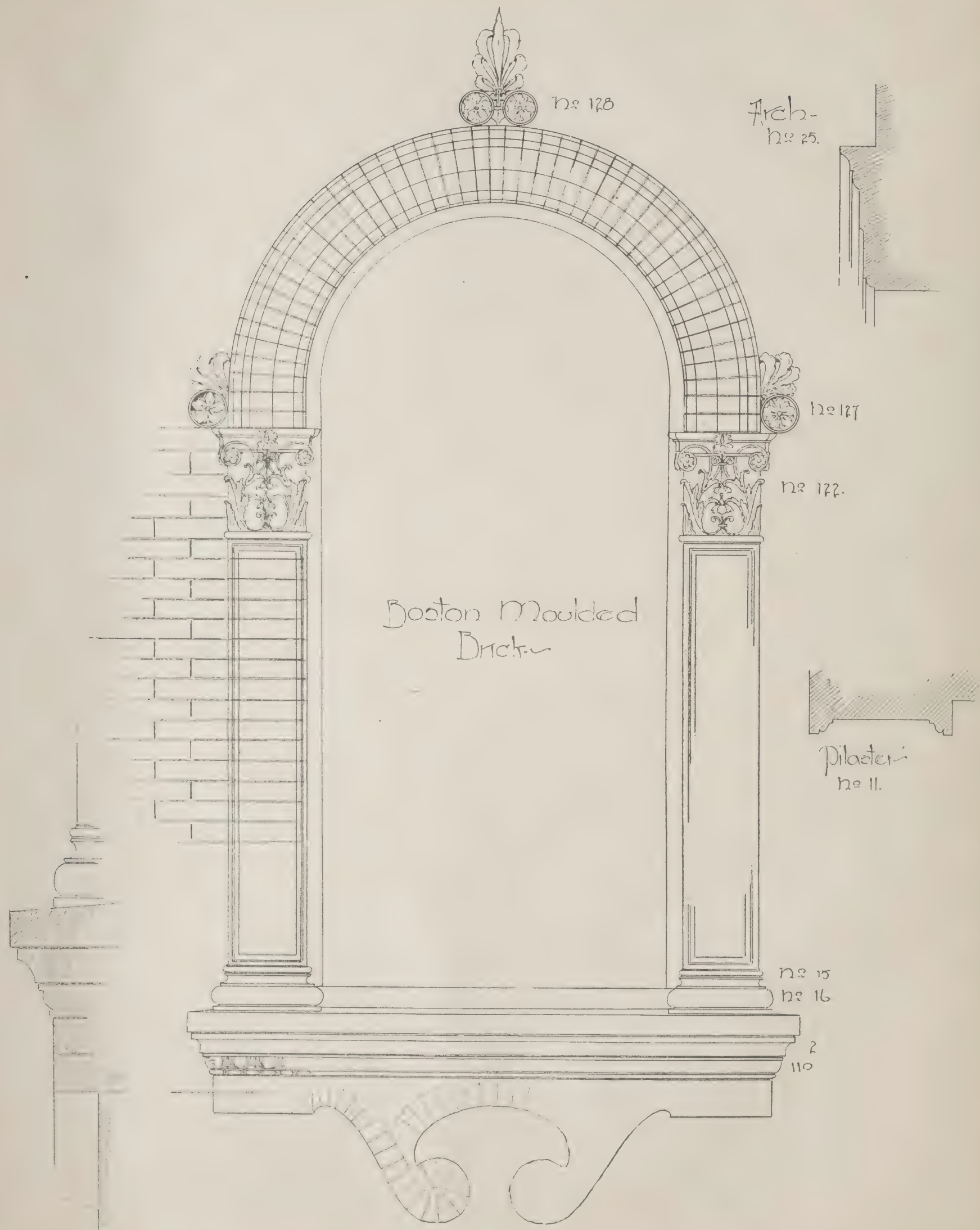
DRAUGHTSMEN'S COMPETITION. PROBLEM I. HONORABLE MENTION. N. C. SCHRANTZ.





MINNESOTA CHAPTER, A. I. A. DRAUGHTSMEN'S COMPETITION. PROBLEM I.

HONORABLE MENTION. LEO GOODKIND.



MINNESOTA CHAPTER, A. I. A. DRAUGHTSMEN'S COMPETITION. PROBLEM I.

DESIGN BY FRED NASON.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

PUBLISHED BY

The Brickbuilder Publishing Company,

4 LIBERTY SQUARE, BOSTON.

P. O. BOX, 3282.

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RED TERRA-COTTA CAPITAL

(1 FOOT 6 INCHES HIGH), ON STONE BUILDING, 1013 MARKET STREET, PHILADELPHIA. FRANK R. WATSON, ARCHITECT, PHILADELPHIA. MADE BY STEPHENS, ARMSTRONG & CONKLING, 1341 ARCH STREET, PHILADELPHIA.

THE subject of American roofing tiles is one that we had hoped to give considerable attention, but the makers have rather discouraged us. Some weeks ago we wrote personally to every maker of roofing tiles whose address we could find, stating that we wished to have some competent writer prepare a series of practical articles descriptive of the different tiles made in this country, giving their size, weight, method of laying, absorption, cost, and any other information of a useful nature. We asked the makers if, in case a fully competent writer could be secured, they would assist us by forwarding a sample of their tile, and necessary information respecting this. Merely a brief answer was requested, and out of some thirty who were addressed three only had the courtesy to reply.

We are at a loss to account for this. The unwilling inference is that their tiles will not bear description of the impartial character we had in view. While this is doubtless the reason in some cases, it is hardly possible that it is so in all. We have not wholly given up the idea of such a series of articles, and we would again ask all manufacturers of roofing tiles to write us, promising their co-operation; for it is only with it that the articles can be made exhaustive and accurate enough to be useful. We had under consideration a special department of the paper, to be devoted to roofing tiles; but this is tabled until we can be more fully assured the tile-makers are in sympathy with the project.

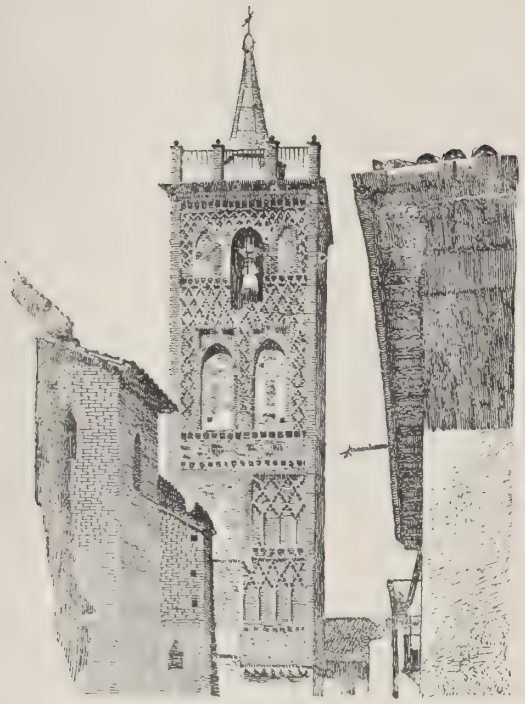
RED TERRA-COTTA CAPITAL

(1 FOOT 6 INCHES HIGH), ON STONE BUILDING, 1013 MARKET STREET, PHILADELPHIA. FRANK R. WATSON, ARCHITECT, PHILADELPHIA. MADE BY STEPHENS, ARMSTRONG & CONKLING, 1341 ARCH STREET, PHILADELPHIA.

THE BRICKBUILDER has from its initial number strongly advocated the introduction of more color into our architecture. Believing that the best material for producing color effects is glazed or enamelled ware, now generally known as faience, it has given considerable space to the subject at the risk of having some readers consider it the advertisement of one firm; and such it is, virtually. But in all arts and sciences there is a stage when achievement along special lines secures leadership, — when such achievement becomes the standard by which less successful works are judged. When such a position is attained, advertisement is unnecessary. Certain names in every field of art or industry are household words. The public is interested in them, and press notices are no longer considered advertisements: they are news.

Simply because Messrs. Fiske, Homes & Co. and Messrs. Atwood & Grueby are practically alone in the production of successful glazed and enamelled ware, because, until surpassed, their achievements must form the standard for modern American manufacture, the space we have devoted to architectural faience has been in one sense an advertisement for them; and let it be so. This work, while undoubtedly commercial, as all manufacturing must be, is so artistic, shows so strong an endeavor towards perfection, that it can but be applauded by every architect, whether or not he cares to use such material.

It is the province of THE BRICKBUILDER to keep pace with the producers as well as with the users of materials of clay. No recent advancement in clay-working is of the importance of this glazing and enamelling of terra-cotta, and we feel every encouragement should be shown the associated firms engaged in the work.



DRAWN FOR COMPETITION No. 9,
By E. B. Nolan, Rochester, N. Y.
A beautiful subject, well rendered. If of the three structures shown all were brick, this drawing would rank well. D. A. Gregg.

ALL BRICK WALLS FOR DWELLINGS OR STORES SHOULD BE BUILT HOLLOW.

I have, in previous articles, pointed out the best way to build hollow walls, but I will here repeat, that for common small dwellings, where only 8½-inch thick walls are to be put up, the best and cheapest way is to set inside two or three courses of brick on edge, then bind to outside course flat, with a "*header*." Every fourth and fifth header should be a *bat*, so that a free circulation of air can be had, from bottom to top of the wall. Fine *grates* of iron or clay, about 4 x 12 inches, should be set in the *base* or *washboard*, on the floor, so that the foul air in the room will pass into the hollow of the wall. If the room be properly ventilated, the temperature in the hollow space in the wall will always be high enough to cause a draft.

No *furring* is needed for *lath*, as no *lath* are used. The plastering is put on the brick and is never damp from dampness in the outside wall. If the walls are well built in this way, they are as strong as if solid. Door and window jambs should be *returned* solid, and a four-inch *pilaster* on the inside gives strength, beauty, and utility to the wall. The *pilasters* may be carried up from the foundation, if the doors and windows are regularly *spaced*, one above the other.

J. S. Crary, Sr., in *The Clay-Worker*.

NOTICE TO COMPETITORS.

All who entered our competition for a brick gable are requested to send us at once their addresses and the mottoes under which the designs were submitted. — *Eds.*

BRICK ONLY ENDURE.

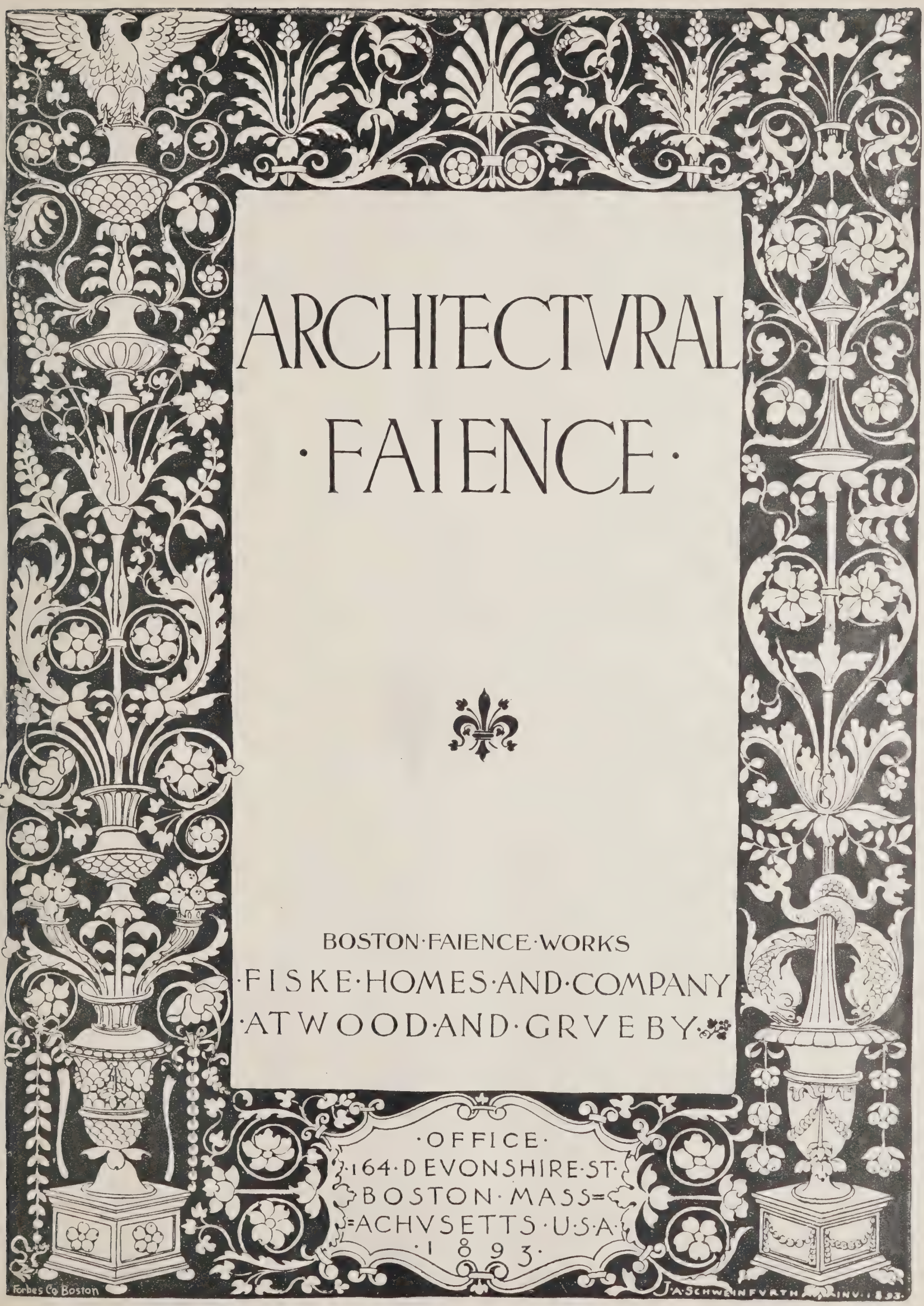
Common clay made into brick and dried in the sun brings down to us written lessons from nearly as far back as the days of the Pyramids. Made into brick and burned by the Romans, it forms the heart of structures from which the limestone coverings have long since disappeared. Apparently indifferent to air, sun, water, and time, brick has the best building record. In addition to indifference to time, weather, and surroundings, a perfect contempt for fire, and when granite walls are shattered and limestones are shivered, bricks ask only to be allowed to depend upon themselves. For thousands of years experience has demonstrated that brick is not only time-proven, but that brick is the only fire-proof material which, with safety, can be relied upon to carry the weight of tall buildings with walls of minimum thickness. Brick is the only material made by men which will outlast all natural building substances. Wood will decay; iron, steel, and stone are oxidized and disintegrated by the action of the elements. All of these natural building substances have been proven to be unsafe in great conflagrations.

Clay Record.

THE DURABILITY OF TERRA-COTTA.

During the discussion following the reading of certain papers on terra-cotta before the Royal Institute of British Architects, Sir Henry Doulton said: "As to its durability, I may perhaps mention two examples which occur to me as within my own observation: The figure of Britannia on the top of the Exchange at Liverpool, made a hundred years ago at Lambeth, and also the figure of St. John Crosby, which was made, when I was a little boy, at Lambeth. These, especially the figure of Britannia, though exposed to adverse influences, are as perfect today as on that of their erection. There happen to be two large statues on the triangular piece of ground opposite St. Thomas Hospital, brought here recently, also made at Lambeth, which are ninety-six years old, and which have been quite untouched by time. There is, of course, terra-cotta and terra-cotta; but there is no reason why terra-cotta should not be absolutely imperishable.

DRAWN FOR COMPETITION No. 9,
By F. A. Henninger, Omaha, Neb.
Sparkling in color but bad in perspective. The sky is too spotty. D. A. Gregg.



COVER DESIGN FOR THE CATALOGUE OF THE BOSTON FAIENCE WORKS.

BY J. A. SCHWEINFURTH.

BOOKS AND PAPERS.

IT is with great pleasure that we call the attention of our readers to one of the most artistic catalogues ever presented by any manufacturers of building supplies. There are few industries that present better opportunities for artistic catalogues than the clay-working industry. That we do not often find these opportunities seized is all the more reason for the strongest commendation when we do, and we desire to compliment Messrs. Fiske, Homes & Co. and Atwood & Grueby upon their good fortune in securing the services of a designer of Mr. J. A. Schweinfurth's ability, not only in the preparation of their catalogue, but upon the far more important work of designing their stock patterns. It is another instance that strengthens the position (if, indeed, it need strengthening) THE BRICKBUILDER has maintained from the very first, — that good results are only possible where architect and manufacturer work together.

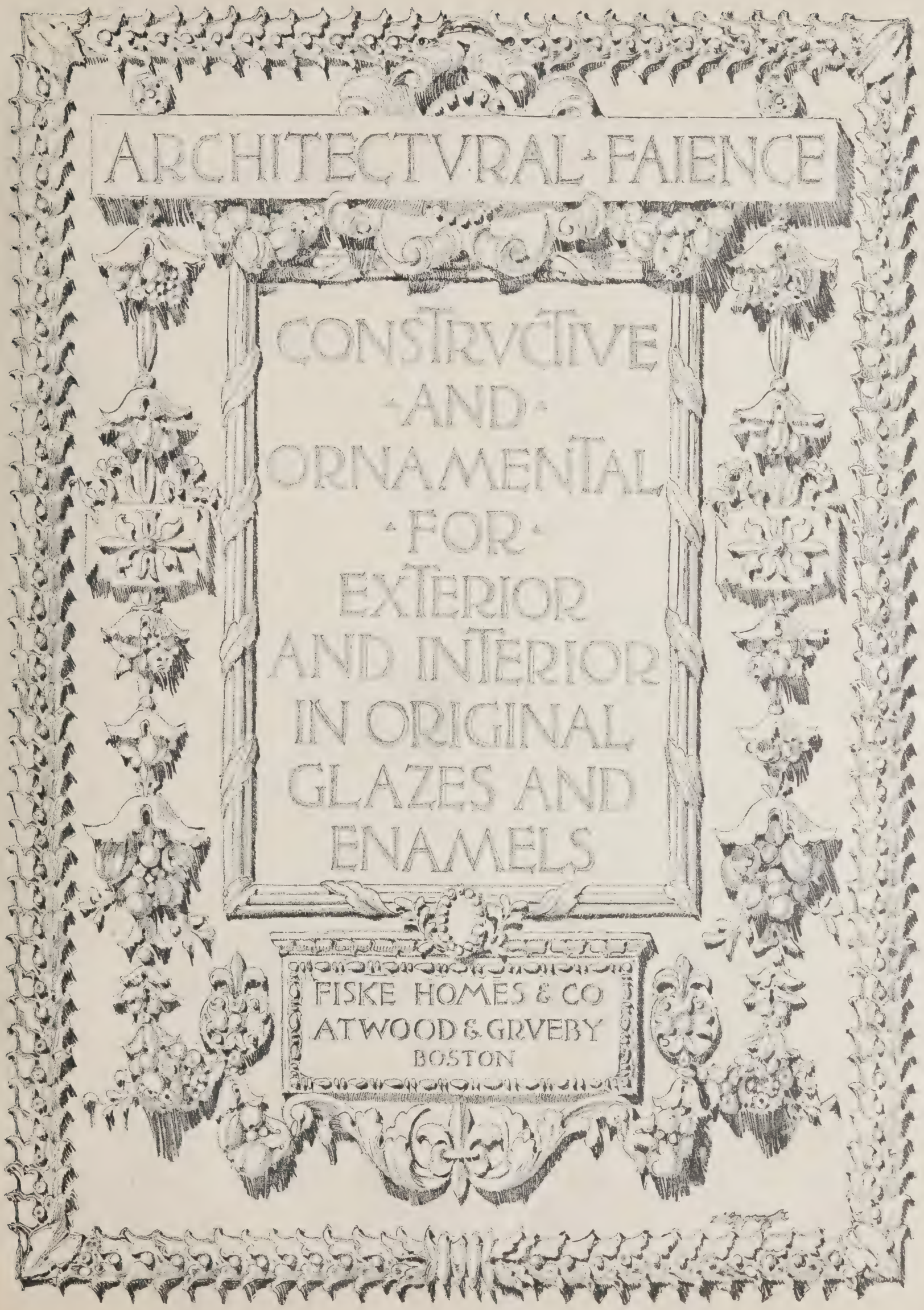
The scheme of the catalogue is that of a portfolio of albertype plates, the nucleus of a collection being sent with the portfolio, which is made to accommodate additions from time to time in the future, as new work is produced by the manufacturers. The portfolio is covered with a beautiful greenish gray shade of Lalanne charcoal paper, on which is printed in black the rich cover design by Mr. Schweinfurth, illustrated on the preceding page. The title-page, illustrated opposite, is by Mr. Harold Magonigle, who is also the designer of the new cover of THE BRICKBUILDER.

Plate I. reproduces at large scale the design for a faience mantel, illustrated by a small half-tone in our January number. Plate II. gives another large faience mantel of entirely different character, while Plates III. and IV. each give two designs for small mantels, all varying in treatment and ably illustrating the possibilities of this material in the hands of a clever designer. All the foregoing are the work of Mr. Schweinfurth, both in design and rendering. In the latter respect they are particularly happy, and no draughtsman could have better models for study in brush rendering. Plates V. and VI. are photographs of details from the waiting-room of the Philadelphia & Reading terminal station at Philadelphia, of which Wilson Bros. & Co. are the architects. Perhaps these examples are put in to counteract any impression that the first plates might give that faience was for small work only; for the work in Philadelphia is fifteen feet high and carried around the immense waiting-room. It is a pity that Plate VII. could not have been executed in color in fac-simile of the drawing, which is a suggestion by Clarence Luce of New York of a color treatment for a faience vestibule; even in monochrome the reproduction is charming. Plate VIII., which is the last plate of the initial collection, is a drawing by Mr. Schweinfurth of the depositors' desk in the Worcester Five Cents Savings Bank, Messrs. Earle & Fisher, architects, and is another suggestion for the interior use of faience. The plates are exceptionally fine albertypes, executed by the Forbes Lithographic Mfg. Co., Boston. Owing to the great expense of producing such a catalogue and the impossibility of indiscriminate distribution, the publishers have placed upon it the nominal price of fifty cents per copy, postpaid, and it is worth several times that price to every architect interested in such work.

In closing, while Messrs. Fiske, Homes & Co., managers of the Boston Terra-Cotta Works, need no introduction from us to the architectural profession, it may be well to say a word or two in explanation of the manufacture of faience. The terra-cotta work of to-day, in this country, shows great advance over that of a decade ago, and it is probably true that in quality of stock and in artistic and mechanical execution we are fully abreast, if not a little ahead, of European countries. For architectural faience the very highest skill in the production of terra-cotta is required. Not only must the work be very near perfection mechanically, not only must it be of the very highest order artistically, *but it must be composed of such ingredients* as will insure the proper uniting of the "biscuit" and the enamel. The enamelling is done in special kilns under the supervision of Messrs. Atwood & Grueby, and here again the utmost nicety in proportioning ingredients, and the greatest care in firing, are necessary, that the carefully prepared "biscuit" be not ruined in the final process. So that, with all the risks of terra-cotta in its highest forms, and the added risks of the enamelling process, architectural faience presents one of the highest and most difficult forms of clay production.

PROF. F. W. CHANDLER, of the Department of Architecture, Massachusetts Institute of Technology, has compiled for the use of students in his department some notes on limes, cements, mortars, and concretes, that for clearness, brevity, and yet completeness are admirable in every way. In preparing these notes, Prof. Chandler has consulted a large number of treatises, reports, transactions of engineering and scientific societies, and he is well fitted by years of active practice in architecture to select from this mass of information such facts as will aid the student of modern construction, and leave out everything likely to hamper him. There is little that any architect ever has occasion to know about the mixing of mortar, cement, and concrete, the selection of lime, cement, and sand, grouting, freezing of mortar or cement, testing, etc., that will not be found in this little pamphlet. The remarks about Beton Coignet and Coquina Concrete (of which the St. Augustine hotels are built) are particularly interesting. These notes are printed, not published, although they should be. A nominal price of twenty-five cents per copy is charged the students, and we will secure them for our readers at that price.

THE current issue of the *Clay-Worker* contains its usual amount of good material, more interesting to the manufacturer, though, than to the architect.



TITLE-PAGE OF THE CATALOGUE OF THE BOSTON FAIENCE WORKS.

BY HAROLD MAGONIGLE.

THE ILLUSTRATIONS.

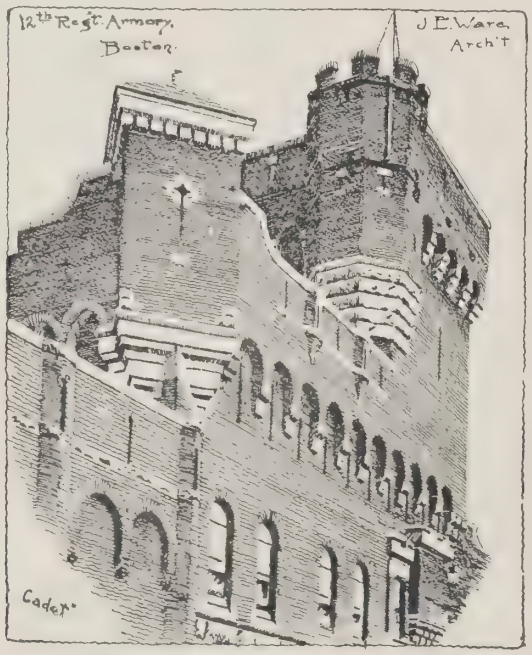
Plate 25. Residence for Mrs. W. H. Heath. E. A. Kent, architect, Buffalo, N. Y.

Plates 26 and 27. Details of the Foulke & Long Institute, Philadelphia. Cope & Stewardson, architects. These buildings, shown by a photograph on page 33, are built of common red brick with red terra-cotta trimmings, executed by Stephens, Armstrong & Conkling of Philadelphia. The detailed treatment of the windows is given on plate 26, and that of the porch on the school (the other building is the residence) on plate 27.

Plates 28 to 32. Draughtsmen's competition of the Minnesota Chapter of the American Institute of Architects. Note: The plates are all reproduced to one-inch scale for elevations and two-inch scale for the details. First mention, Max Foester (plate 28); second mention, John Rachac, Jr. (plate 29); honorable mention, N. C. Schrantz (plate 30); Leo Goodkind (plate 31); Fred Nason (plate 32). The programme was as follows: —

Problem I. To design a window opening with moulded brick finish. Size of opening, three feet six inches by seven feet; style, Italian Renaissance. Required: —

An elevation to one-and-one-half-inch scale and moulding details to three-inch scale, the numbers and make of all moulded brick to be clearly shown on drawing or an isometrical perspective of stretcher and header of all moulded brick not given in catalogue.



DRAWN FOR COMPETITION No. 9.

BY C. HOWARD LLOYD, BOSTON. A NEAR APPROACH TO A GOOD DRAWING, BUT A HEAVY HALF-TONE PREVAILS TOO MUCH AND THE LINE USED IS RATHER TOO STUDIOUSLY WAVY. D. A. GREGG.

Your journal is in just the right line to check and tone down the callow, flashy architecture of our vigorous city. I esteem it highly.

H. M. PATTERSON, Architect, Butte, Mont.

PATENTS.

A MONTHLY LIST OF RECENT PATENTS GRANTED, WHICH CONCERN THE CLAY-WORKING AND THE BUILDING INDUSTRY, REPORTED SPECIALLY FOR THE "BRICKBUILDER," BY H. M. STERLING, ATTORNEY AT LAW, WASHINGTON, D. C.

BRICK-KILN. Napoleon B. Hafer, Bloomington, Ill. April 11, 1893. No. 495,134.

BRICK MACHINE. Harry L. Balson, St. Louis, Mo. April 4, 1893. No. 494,911.

FIREPROOF PARTITION FOR BUILDINGS. Isaac Johnson, New York, N. Y. April 4, 1893. No. 494,866.

CONTINUOUS BRICK-KILN. William Oakes and James Oakes, Leeds, England. April 4, 1893. No. 494,687.

CLAY MILL. Calvin W. Vaughn, Cuyahaga Falls, Ohio. March 28, 1893. No. 494,515.

PUG-MILL FOR BRICK MILLS. Henry J. Bond, and Louis Hilling, Shawnee, Ohio. April 11, 1893. No. 495,389.

APPARATUS FOR MIXING WET AND DRY CEMENT MATERIALS. Henry Froehling, Richmond, Va. April 11, 1893. No. 495,323.

BUILDING SHIELD. William Durkin, Philadelphia, Pa. April 4, 1893. No. 494,848.

CEMENT. Vernor F. L. Smidth, Copenhagen, Denmark. April 4, 1893. No. 494,763.

METALLIC CEILING. Albert Friedley, Chicago, Ill., assignor of one half to Herman Voshardt, same place. April 18, 1893. No. 495,935.

DRAWN FOR COMPETITION No. 9.

BY C. HOWARD LLOYD, BOSTON.

RICH IN COLOR, WITH BEAUTIFUL CAREFUL DRAWING OF DETAIL. THE HALF-TONES ARE A TRIFLE DARK, AND THE WAVED LINE A LITTLE TOO MANIFEST. THERE IS A LARGE AMOUNT OF TERRA-COTTA IN THE SUBJECT. D. A. GREGG.

PROFESSIONAL CHANGES.

Messrs. Wendler & Spiro, specialists in mill architecture, have moved their offices from Watertown, N. Y., to Carthage, N. Y.

Messrs. Gould & Angell, of Providence, have taken into partnership Mr. Frank H. Swift, who has for some years been their first assistant. The new firm, Gould, Angell & Swift, will have, in addition to their Providence office, a Boston one at 31 Milk Street.

Mr. W. W. Kent has entered into a partnership with Messrs. John and George E. Jardine of New York, the new firm being Jardine, Kent & Jardine. The former offices of Messrs. D. & J. Jardine, at 1262 Broadway, will be occupied.

Mr. Geo. H. Clemence, of Worcester, has associated with him his brother, Mr. Chas. R. Clemence, of New York, under the firm name of Geo. H. Clemence & Co. The senior member of the firm studied designing under the late Prof. Letang, at the Massachusetts Institute of Technology, and the junior member has had a good training in construction with both Norcross Brothers and Darling Brothers.

Mr. Frank Ashburton Moore has opened an office at his residence, 25 Catherine Street, Worcester, Mass. Mr. Moore is a graduate of the Massachusetts Institute of Technology, and has worked with Mr. R. M. Hunt, of New York. For the better part of two years he has been travelling in Europe.

"AS OTHERS SEE US."

Please send me THE BRICKBUILDER for 1893, and also the back numbers for 1892. I read a copy which was mailed to me, and find some very valuable designs and drawings in same. I think it is a paper that ought to be in every mason contractor's office.

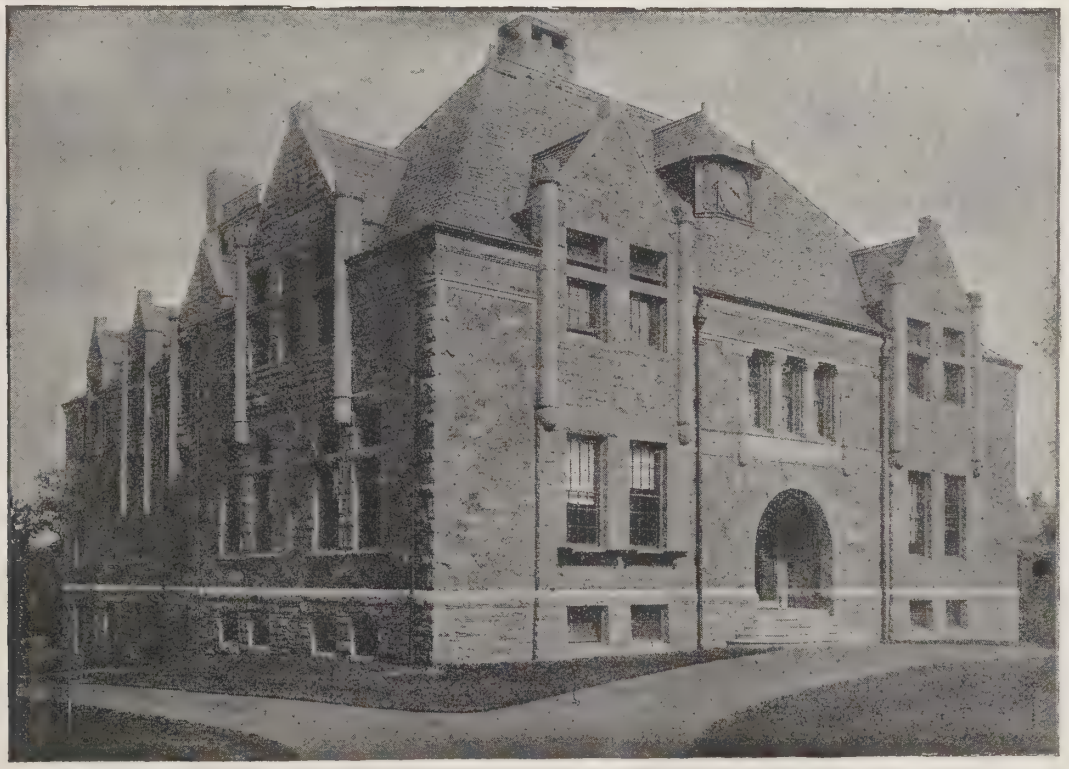
A. C. CRAIG, Mason Contractor,
59 So. Canal St., Chicago.

I am very much pleased with last year's BRICKBUILDER.
H. L. JOHNSON, Architect, Calgary, N. W. T.

I like the work very much indeed and hope to be always on your list.
W. D. BUTTERFIELD, Architect, Detroit, Mich.

THE BRICKBUILDER is bound to be a valuable adjunct to any office.
J. C. STITT, Architect, Norfolk, Neb.

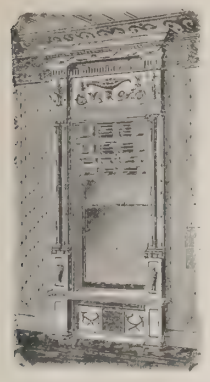
I have a number of illustrations of Richardson's buildings, but of course we don't get the beauty of detail in the brickwork that is brought out in the copy you sent me.
L. A. DICKINSON, Architect, Elyria, O.



WILSON HALL (Brown University),
PROVIDENCE, R. I.

MR. DAVID C. ANTHONY, Builder, East Providence. | Laid in Clinton Hematite Red. | MESSRS. GOULD & ANGELL, Archts. Providence.

ILLUSTRATION FROM
"A Little Talk on Metallic Paints and Mortar Colors,"
PUBLISHED BY
THE CLINTON METALLIC PAINT CO., OF CLINTON, N. Y.,
Manufacturers of HIGH-GRADE MORTAR COLORS AND METALLIC PAINTS.
Write for this book, mailed free on application.
EASTERN NEW ENGLAND AGENTS, FISKE, HOMES & CO., 164 Devonshire St., BOSTON.



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ARCHITECTURAL TERRA-COTTA.

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CATALOGUE AND ESTIMATES UPON APPLICATION.

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THE BRICKBUILDER

VOL. II. BOSTON, MAY, 1893. NO. 5.

THE RENAISSANCE OF BRICK AND STONE.

From the Building News.

SEVERAL very effective examples of what can be done in brick, terra-cotta, and stone to relieve the dismal and monotonous lines of our city and West End streets have been erected of late. They at least exhibit an endeavor to depend mainly on a free use of material and the actual exigencies of building. For a long time past architects have been "ringing the changes" on the various phases of that great and rather undefined epoch of architecture known as the Renaissance — sometimes Italian, sometimes French, sometimes Flemish or English, early or late developments. The variations thus given have been based on certain precedents more or less suitable to the purpose of the erection. The attempt to break away from the traditional forms of mere style is apparent. The old pilastered front, with its "orders" piled over each other, and the later classical French style, are disappearing, and we are rather falling back on the earlier French, or the Renaissance of Elizabeth and James. The era of Francis the First has been most popular with English architects, and we cannot wonder at it when we consider that this particular phase of the French Renaissance was eminently a secular and flexible style. It was introduced at the beginning of the reign of Charles VIII., late in the fifteenth century, and continued to the end of that of Francis II., just when the monarchical power of France was rising to its climax, when the great châteaux of the feudal ages were being rebuilt or remodelled, when the Louvre and Tuileries were rising in their stately magnificence on the ruins of the old residence of the kings, and when Fontainebleau and Chambord were designed. It is the spirit rather than the letter of these earlier styles of French and English Renaissance that is just now in the ascendant. One reason of this is that the classical varieties, those in which the orders are used, can only be employed in stone buildings; while the earlier phases, like our own Elizabethan and Flemish, admit of brick and terra-cotta treatment. Columns, entablatures, pediments, and other classical features are more suitably executed in stone. The circular shaft has never been successfully worked in brick or even in terra-cotta of the usual cast form, and the straight and curved mouldings of cornices and pediments are for like reasons favorably executed in stone, though one sees several exceptional instances where great truth of line has been preserved. In the drying and burning of terra-cotta blocks, the greatest care has to be used to prevent twisting and warping, which has necessarily rendered a rigid classic style far less appropriate. This is a technical limitation that has prescribed certain phases of the style. The artist who desires to work in brick and terra-cotta has been obliged to resort to a more pliant adaptation, for which the English and Belgian varieties for the style have afforded him every facility.

Fleet Street and the Strand are beginning to show indications of this spirit. Next to St. Dunstan's Church, two old houses of the seventeenth century — one of them used as a fish shop, and very interesting for its bay window and gallery — have been demolished, and in their places two red brick fronts have been erected, in which the architects have been successful in retaining something of the character of old architecture, largely of timber and plaster, in red brick and stone. Instead of the usual flat front, a wide moulded arch occupies the whole width of front, within which recess a stone bay window, slightly canted, of two stories, is made to project. The red brick is carried through bay window in one case, as a horizontal band between the head of the lower and the sill of the upper window, which has been richly carved in red brick panels; while a similar plain red brick frieze and cornice are carried round under the stone balustrade of the upper window. This recessed bay treatment has been frequently adopted in narrow frontages; but in the instance before us the binding together of the red work and the stone by the red brick bands is decidedly an improvement on the bay of stone throughout, which is seen in the adjoining house. The bay has also stone-moulded mullions, with the centre light arched, which keep up the character of the old wooden window that it surplants. The brick-splayed jambs and coved soffit of arch are enriched by panels and mouldings, and there is an ornamental brick frieze above it. The upper story is gabled. Another

instance of the arched front with a stone bay window is seen in the Strand on the south side, just below St. Mary-le-Strand. Here the bay window of two stories is also of square projection, with pilasters between the lights, and carved cushion friezes, not unlike the design of many of the old wooden bays which have disappeared. One advantange of the arched front is that unnecessary weight is taken off the bressummers, both of the bay window and the shop front, and a lighter and more open fenestration can be introduced. A greater merit is that the heavy mass of brick wall or piers does not appear to rest upon a plate-glass front.

In the West End we observe a few contributions to the solution of that crux of modern architecture,— business premises and shops. The new buildings for shops with residential floors above, in Sloane Square, from the design of Mr. F. G. Knight, A. R. I. B. A., have the redeeming feature of high green-slated roof with broken end gables, bay windows in the first and second stories, and ornamental bands of enrichments between the windows; but the ground or shop story is commonplace, and the large plate-glass windows spoil the effect. The fronts are of light-red bricks, and the terra-cotta dressings and enrichments are admirable specimens from Mr. J. C. Edwards's Ruabon Works. Mr. T. E. Collcutt has attempted a shop-front treatment in some premises in Mount Street, Grosvenor Square, but the same prejudice for large plate glass has had to be tolerated. The upper portion of the fronts in stone and brick, in a nearly French Renaissance, is effectively managed. One of the shops is entirely of stone, with panelled pilasters between wide mullioned and transomed windows, with relief panels between the first and second stories. The upper story has a large double-light dormer with curved enriched pediment, supported on each side by console-like scrolls, perforated. In the select residential quarter of Cadogan Square — dedicated to the red brick or Queen Anne revival — Messrs. Ernest George and Peto have one wide-fronted house, in which they have shown that their light, piquant style and handling, so fascinating in their sketches, is capable of being transferred to brick and stone. The projecting porch on one side is carried up as a two-storied bay window, finished by an elegant concave, oriel-shaped roof, with some excellent carved work in bold relief between the windows and carved angle mullions. A small pierced arcade of two arches gives light to the open porch. On the other side of the front is a mullioned flat bay window of two stories, built in stone. Above is a wide Flemish-looking gable, with three tiers of ramps and finials embracing two stories of mullioned windows, with panels of carved brick or terra-cotta relief — we forget which (we lately illustrated this house). There is much that is characteristic of the individuality of the architects. One of the bay windows has a decided English feeling, and we can also perceive much that is Belgianesque and even Jacobian in the details. By the way, Cadogan Square presents a *repertoire* of the red brick revival. The adaptation of French, Flemish, and English Renaissance to town or street residences is here amply and variously exhibited. Gables, curved, broken, and straight, in all varieties, are to be seen in this residential neighborhood; indeed, there is a distracting display of gable design that is more unrestful than agreeable, and the same unrestfulness makes itself felt in the excessive breaks and details of the houses, — a result of an effort for variety, which can be often carried to the extreme of confusion and embarrassment. If we can point to many defects and extravagances of design, we can also point to excellent brickwork, carved brick ornament, and terra-cotta work. In Collingham Gardens the same architects have a more Italian treatment in stone. A very commodious one-story bay window projects on one side of the entrance, and above is a series of five windows separated by engaged columns with relief arches, and the spandrels have iron ornamental fleurs-de-lis,— a characteristic detail in other works by the same architects. The upper part is gabled (see "B. N.," April 2, last). Less appropriate for a narrow front is what we may term the Palladian or Venetian treatment,— several bays or windows divided by columns or pilasters to each story. This mode of distributing the

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columns is certainly better adapted to a façade of some length and importance instead of a narrow strip of several stories in height. Loss of scale is also a consequence of thus dividing the front into so many bays and windows. Instead of one wide window with mullions, there are five or more, which, in a frontage of about twenty feet to twenty-five feet, has a crowded effect, and impart a pinched and pretentious appearance to the building. A further disadvantage of the screen pilasters and windows is the difficulty of making the shop windows an agreeable part of the elevation, as the intermediate piers or pilasters have to rest on the bressummer or cornice of the shop front.

TERRA-COTTA DETAIL
BY THE PERTH AMBOY CO., FROM THE BUILDING FOR THE SOCIETY OF SAVINGS, HARTFORD, CONN.

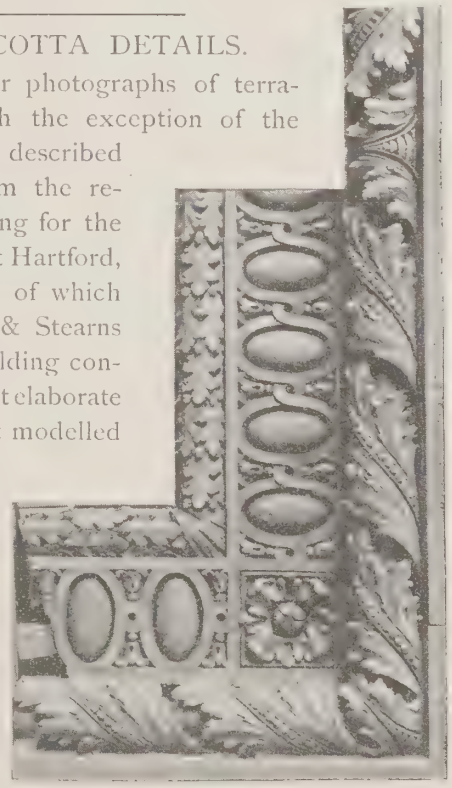
In Bishopsgate Within a narrow frontage has been rebuilt in terra-cotta, with the exception of the granite ground story, in a light style. There are four main stories of orders and entablatures, the latter having panelled friezes in relief; the shafts are rusticated, and the window openings have centre mullions and transoms. Over the third story is a deep moulded cornice surmounted by a balustrade. The ornamental gable, with its pedimented window and side panels, surmounts this lofty façade and abuts against the massive classic building, with its one order of pilasters and heavy cornice. The entablatures broken round the columns produce a lightness appropriate to the material, which is not always observed when this material is used. In this and many other examples the solid wall character has been partially avoided. Orders and pilasters are popular; they are traditional modes of decoration, however unsuitable they are for narrow buildings.

We have had occasion to refer to the buildings in Rosebery Avenue. The lately erected Clerkenwell Testing Office for Weights and Measures, for the London County Council, which has been erected from the designs of Mr. Blashill, the architect to that body, is another adaptation of Renaissance to the purpose of a utilitarian building, treated in a plain but dignified manner, faced with red bricks, and having red Corsehill stone introduced.

The examples we have been referring to illustrate three or four distinct phases of modern brick renaissance; they also show the attempt to adapt the spirit of the style to various modern conditions. One decided departure is from the solid pierced wall and pilaster character to a far less restrained style. The gabled front, though not a necessary part of the design, is certainly popular, and appears to be a protest against the predominance of level lines. But these buildings are indications of the development of a brick style that is suitable for street business and residential purposes, especially for narrow frontages. The "hole-in-the-wall" and the screen of pilasters are characters that are both disappearing. There has been too much of the slice-of-façade architecture in vogue—we mean a vertical slice of design suitable for wide and spacious elevations, but quite unsuited to a narrow-fronted building. This is the negative description of our street architecture. A more positive definition is that our recent buildings of this description partake of a framework of brick or stone, the windows being arranged more or less as a panel of lights, such as a flattish bay window, or a series of mullioned lights carried up in vertical lines, with horizontal bands of panelling or ornament. And it is this idea which is finding expression in our brick and stone or terra-cotta architecture in London and other towns. It is something to see clearly the principles to be kept in view,—to avoid the solid pierced wall, the abrupt slice-like effect of a narrow frontage; to make brickwork the motive of our ornament, instead of to design in it as we should do in stone; and to treat our windows, not as separate and disjointed apertures, but as a single bay with its necessary subdivisions.

OUR TERRA-COTTA DETAILS.

IN this number, our photographs of terra-cotta details, with the exception of the column illustrated and described on page 52, are from the recently finished building for the Society for Savings at Hartford, Conn., the architects of which are Messrs. Peabody & Stearns of Boston. This building contains probably the most elaborate and some of the best modelled terra-cotta work in this country. It is the work of the Perth Amboy Terra-Cotta Company, and is a good example of what the artists who compose the modelling force of that company can do, when given opportunity. The building has an extremely rich frieze, portions of which will be illustrated in a future number.



TERRA-COTTA DETAIL
BY THE PERTH AMBOY CO., FROM THE BUILDING FOR THE SOCIETY OF SAVINGS, HARTFORD, CONN.

TERRA-COTTA AND FAIENCE AS MATERIALS FOR ARCHITECTURAL AND DECORATIVE APPLICATION.

(*Continued from April number.*)

THE degree or tone of color most desirable for architectural purposes ranges from a warm buff to a deep red, and by the aid of recent improvements in manufacture, aided by improved chemical knowledge of a technical character, it is now possible with a good material to produce almost any required tone and any required color. In the production of these results with any accuracy, the quality of the fuel used is an important element. A variation in the sort of fuel used often produces very perplexing results, and unless its nature is understood, may defeat the greatest care in other processes.

A sulphureous coal is one of the greatest drawbacks to purity of color, and often furnishes one of the constituents for chemical combination with some of the salts evaporated by the clay, and with them forms several varieties of sulphates, often know as "scum," which more or less disfigure the surface of the bricks or terra-cotta. Possibly I may have said enough on the question of raw material to make clear some of the salient points connected with it, and without further enlarging, I will pass on to the process of manufacture.

It will at once be understood that the processes of manufacture are only next in importance to the nature and character of the raw material. In some cases, the very simple and elementary processes of preparation are all that are necessary to secure such results as are possible with the material, whilst in other cases a strong and costly plant is necessary to reduce the raw material under control, and produce from it satisfactory results. With the plastic and slender clays to which I have alluded but little more is necessary, if they are clean and free from grit, than thorough working in a pug-mill,— a machine composed of knives revolving in a cylinder,— the effect of which is to work up the material into a homogeneous mass of the requisite degree of plasticity. In some cases, however, the clay or loam is full of stones, hard grit, which either must be crushed between heavy rollers or washed out, and both these processes are more or less in use. The hard and strong marls and fire-clays, however, require more thorough treatment; in many cases it is desirable to reduce them to the condition of a fine powder as a preliminary process. In all clays thorough weathering or exposure to the oxidizing influences of the atmosphere is most desirable, and complete plasticity of the homogeneous quality of the clay depends largely on the thoroughness with which this is applied. Unweathered clay is much more likely to twist and warp in drying and burning than is the case with clay imperfectly and hastily prepared.

Of late years very powerful machinery has been adapted to all preliminary processes of preparation, by which both time and labor are saved, and certainty of result secured; after being reduced to a plastic condition by these means, the clay is all the better for remaining in a mass for a lengthened period, if suitably protected from incrustation. There are several methods of moulding terra-cotta, and some manufacturers have adapted machinery to some portion of this work; but the only really satisfactory method, although not the cheapest in all cases, is to press it into plaster moulds accurately made from plaster models.

The making of the model is one of the niceties of the terra-cotta manufacture. Unless made to shrinkage rule in the first instance, the design or working drawing of the architect has first to be enlarged the requisite size to provide for the ascertained shrinkage of the clay in drying and burning. In all the first-class terra-cotta works, this shrinkage can be determined to a very great nicety, and it is most important that it should be so if the various blocks are to work together with accuracy. The most thorough method is to prepare a plaster model exactly representing the required block, plus the shrinkage allowance; and if this is skilfully done, and a mould taken from it in the way best adapted to moulding the clay, and afterwards withdrawing the mould, accuracy of result is reduced almost to a certainty. It cannot be denied, however, that there is in this operation much room for bungling and equal scope for the exercise of true architectural skill and practical knowledge and experience. Inaccurate or badly made models and moulds are apt to twist the clay, and by no means unknown, and hence often follow bad joints, irregular lines, twisted blocks, and general anathemas, only to be avoided by great care and practical skill in the department in which good, careful, and experienced workmen are not too plentiful. When decorative or enriched modelling is required, there is no further scope for intelligent and trained skill; many enrichments have been murdered in the modelling, and the most graceful designs converted into hard and lifeless monstrosities from a lack of artistic perception on the part of the modellers. Having personally devoted considerable attention to this subject, I may, perhaps, be permitted in passing to express the opinion that, although the English sculptor in stone can possibly hold his own with the world, yet I have not yet found an English modeller in clay who can hold his own with the Continental modellers of similar calibre trained in the Italian and French methods of manipulation, either in respect to the speed, quality, or spirit of his work. Possibly now that terra-cotta is assuming greater architectural importance in this country, this position may not be of long continuance; but the great requisite is that trained artistic perception should more intelligently guide manipulative skill. After the clay is moulded or modelled it has to then dry very gradually, for hurry, haste, and push are fatal to true work in terra-cotta. Ample floor or still room is necessary, of a suitable temperature, and considerable attention is often necessary to regulate judiciously the process of drying. When sufficiently dry — and clays differ as to this condition — the final and possibly most critical process of burning follows. This process is

variously performed, according to the quality and nature of the clay, and according to the standard of excellence in color, exactness, and durability sought to be obtained. Some terra-cotta will not bear more than a good red heat, whilst some require a degree of heat sufficient to melt iron, or even steel.

Much depends on the quality of the material and the color desired, and very great practical and very great technical skill is required to secure even an approach to perfection. By some makers muffled kilns are adopted, in which the flame does not come in contact with the clay. Some adopt down-draught kilns, and others up-draught, some use square kilns, and some round. There is, in fact, no rule, but the rule of experience, based upon the nature of the materials and the appliances at command; but what is essential to good terra-cotta, whatever the precise mode of securing it, is that it should be thoroughly well burnt. I need not say, however, that in some cases the rule of thumb and precedent is more blindly followed than is altogether desirable, and a thoroughly intelligent perception of cause and effect upon anything like scientific data is too often the exception rather than the rule, and hence it often happens that great irregularities occur in the degree of heat applied and in color produced. Much greater attention has of late, and is now being given to this most important subject, and, indeed, it is obvious that it is a critical point in determining the question of the more general application of terra-cotta. Badly made and carelessly burnt terra-cotta is simply an architectural abomination, but assuming the conditions to be satisfactorily solved, as they may be, I will next allude to the question of durability.

Is terra-cotta as durable as stone? I might reply in one sentence: There are all qualities of stone, and all qualities of terra-cotta, and the inferior qualities of either are undeniably bad; but I believe I might go so far as to affirm that a thoroughly well-made, well-burnt block of terra-cotta is equal in constructive durability to the best stone, and probably superior. The fact that burnt clay of a good quality is almost indestructible, is proved by remains of bricks and tablets discovered by the researches of Layard and Rawlinson amongst the ruins of ancient Babylon, in an almost perfect state of preservation, whilst we have modern illustrations of its durability over lengthened periods in the quaint old brick structures yet met with in England, and on the Continent, affording, under trying conditions of climate, valuable evidence of the durable nature of well-burnt clay.

The great test of durability is the power of resistance to severe and sudden atmospheric changes of temperature, and to the more insidious attacks of the acid gases which, in all large cities, are more or less present in the atmosphere, and often work sad havoc with buildings on which the greatest care has been exercised in the choice of materials. Instances of this are too well known and numerous to need reference. The question is, Will terra-cotta be more durable than stone?

The general use of architectural terra-cotta in this country is too recent, and the dates too imperfect, to afford any very striking comparative facts on this subject; but collated evidence, I think, strongly supports the presumption that well-made and well-burnt terra-cotta is much less pervious to the action of acids than stone. As far as chemical tests are of any value, they are certainly strong in support of such a proposition.

The soft silicious bricks and terra-cotta made of silicious clay, whilst they often secure a charming architectural effect, are too porous and open in their grain to withstand any severe disintegrating action. Some qualities of silicious bricks undergo a certain degree of induration by atmospheric exposure under modified conditions, but they do this by their reception of atmospheric particles, and are therefore the more readily subject to the discoloring influences of smoke in the atmosphere of large towns, very quickly becoming choked with carbon, which is a serious drawback to their general use for enriched work. The most insidious and powerful disintegrant is alternate frost and thaw, and if these operate under conditions favorable to their action disintegration is rapid. Terra-cotta half burnt, like a soft stone, is sure to yield to such influences sooner or later; but it may safely be affirmed that no material is more likely to resist them than a thoroughly plastic clay, of good quality, the constituent parts of which have been brought not into mechanical, but into chemical combination by the requisite amount of heat.

(To be continued.)

VITRIFIED BRICKS IN OHIO.

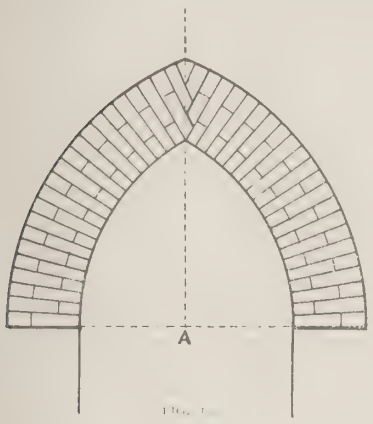
TWENTY–FIVE miles north of Akron, O., on the Valley Railway, is situated the plant of the Akron Vitrified Pressed Brick Company, a plant that for its immensity and for its systematic operation is equalled by few clay-working establishments. The output of these works is a pressed brick of the highest grade. The clay used allows of burning to a state of vitrifaction, and the bricks come out a beautiful shade of cherry red. They stand the severest crushing tests, often sustaining a greater weight than granite.

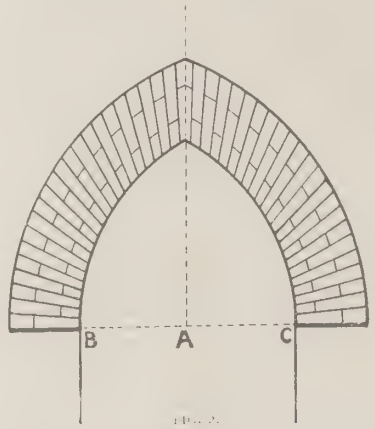
The product of the works is not confined to plain brick, but nearly every conceivable variety of ornamental and shape brick is manufactured, and recently large orders have been filled with a class of work that heretofore it has been supposed could be produced only in terra-cotta. With every facility for manufacturing, the company are safe enough in offering to turn out anything in the way of fancy or special design that may be desired. So far, in spite of steadily increasing their facilities until their original comprehensive plant has been more than doubled, they have been continuously rushed with orders, and it is doubtful, if they keep their bricks up to the present standard, whether the time will ever come when they are ahead of their orders. To keep even, make satisfactorily prompt shipments, is their main effort now.

THE POINTED ARCH.

BY ARTHUR SEYMOUR JENNINGS.

AMONG those who are responsible for the construction of brickwork there is often some difficulty as to the correct method of radiating the joints of arches, and this is especially the case with pointed arches. There is a very good rule that may be applied broadly to all brick arches, and that regulates the direction of the joints; it is that such joints shall run at right angles and tangents to the curves drawn at the joints, where such joints meet





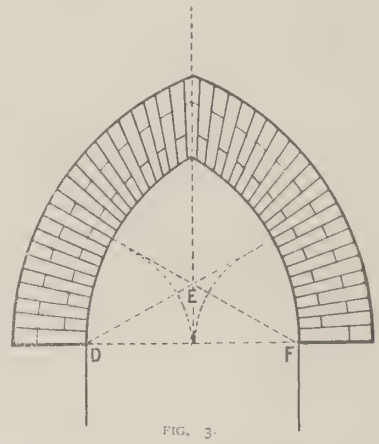


FIG. 3.

the curves. In other words, the joints shall be at right angles to the curve itself, so to speak; and hence an application of this rule will cause the joints to radiate to the point from which the curve was struck. In the case of a semicircular arch, the joints will of course radiate to the centre of the semicircle, and obviously each joint will then be at right angles to the tangents referred to. For an elliptical arch the rule of right angles to tangents is the only one that can be followed to advantage in order to produce a perfectly symmetrical appearance. It may be said in passing that, as is sometimes the case, so-called elliptical arches are constructed by means of three arcs of circles, two of them struck from points corresponding to the foci of an ellipse, and the one beneath the joint will radiate to these centres. It need hardly be said that a true ellipse cannot be described by means of compasses.

The rule referred to must frequently be modified in the case of pointed arches; for instance, for the arch known as the equilateral; that is, one set out upon an equilateral triangle. If the rule be followed without modification, it will bring about a somewhat awkward joining of the crown of the arch and form a very ugly finish, which for outside brickwork would be very objectionable. This is clearly shown in Fig. 1. Some architects get over the difficulty by inserting a cap stone, but this is very frequently undesirable.

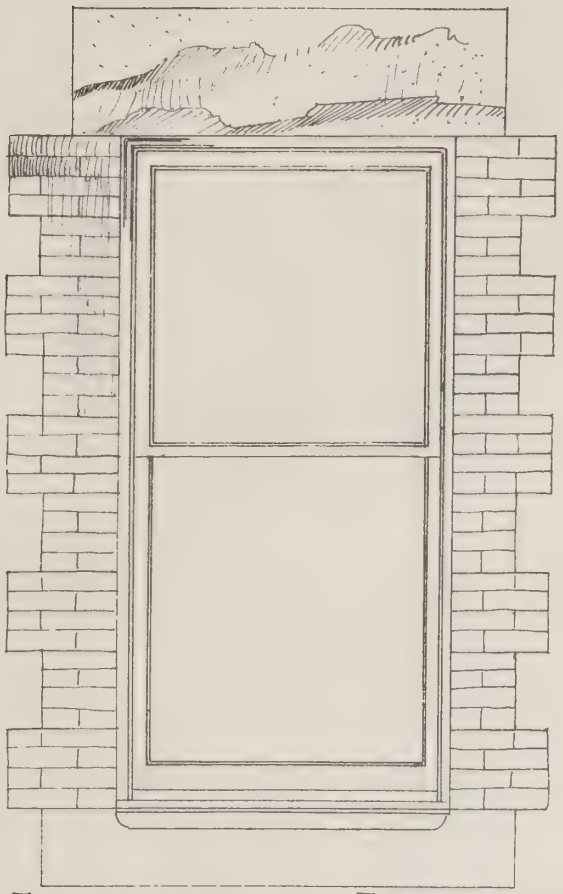
Perhaps a better plan is to follow the method shown in Fig. 2. In this case all the joints radiate to the centre A, and hence none of them are at right angles to the tangents. The great objection to this method is that all the bricks are of different shapes, and hence a single template or pattern, as a guide by which to shape all the bricks, is of no service, a new template being required for each brick throughout the arch. It is one of the advantages of following the rule that a single template answers for all the bricks. Another objection to the method shown in Fig. 2 is that the form of jointing tends to give the arch a false appearance, making it apparently more pointed than it really is.

Everything considered, the best plan of constructing an equilateral arch is to adopt a compromise between the methods shown in Figs. 1 and 2 and to radiate the bricks of the crown to the centre E, and those beneath to the two points D and F, respectively, from which the curves were struck. The point E is found by intersecting lines produced, as clearly shown by dotted lines. Some prefer to place the point E higher up, so that only about six or eight bricks of the crown are radiated to it.

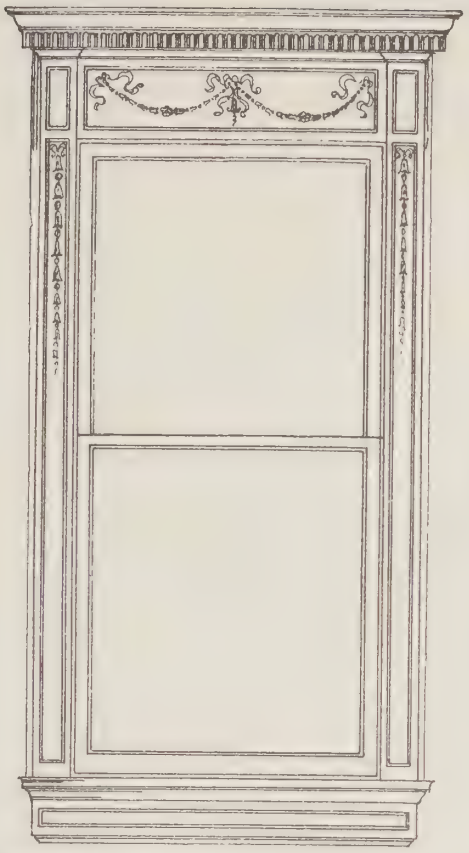
In dealing with pointed arches other than equilateral the same method may be followed, the point E being raised or lowered, as may be necessary, according to the relative span and height of the arch. In nearly all cases this plan will be found to produce the best results from every point of view, producing not only the most attractive-looking arch, but one that can be constructed with a minimum of labor.

A word or two may be said here as to the construction of outside arches in general. The plan followed very largely is to employ what may be termed a rough arch, or one built in single rings of uncut bricks. This method, while producing a strong arch, is altogether objectionable from the point of view of appearance. An outside arch in good brickwork should be built by having all the bricks arranged or cut to fit accurately together according to the curve; this will give parallel joints and wedge-shaped bricks, and if the work is done carefully, and the joints are very thin, the effect will be extremely good. If in addition a carefully moulded brick is used to emphasize the extrados of the arch, and perhaps another moulded brick, formed, say, in the shape of a quirked bead on the intrados, the appearance of the arch will be improved to an extent that would hardly be credited by those who have not used them.

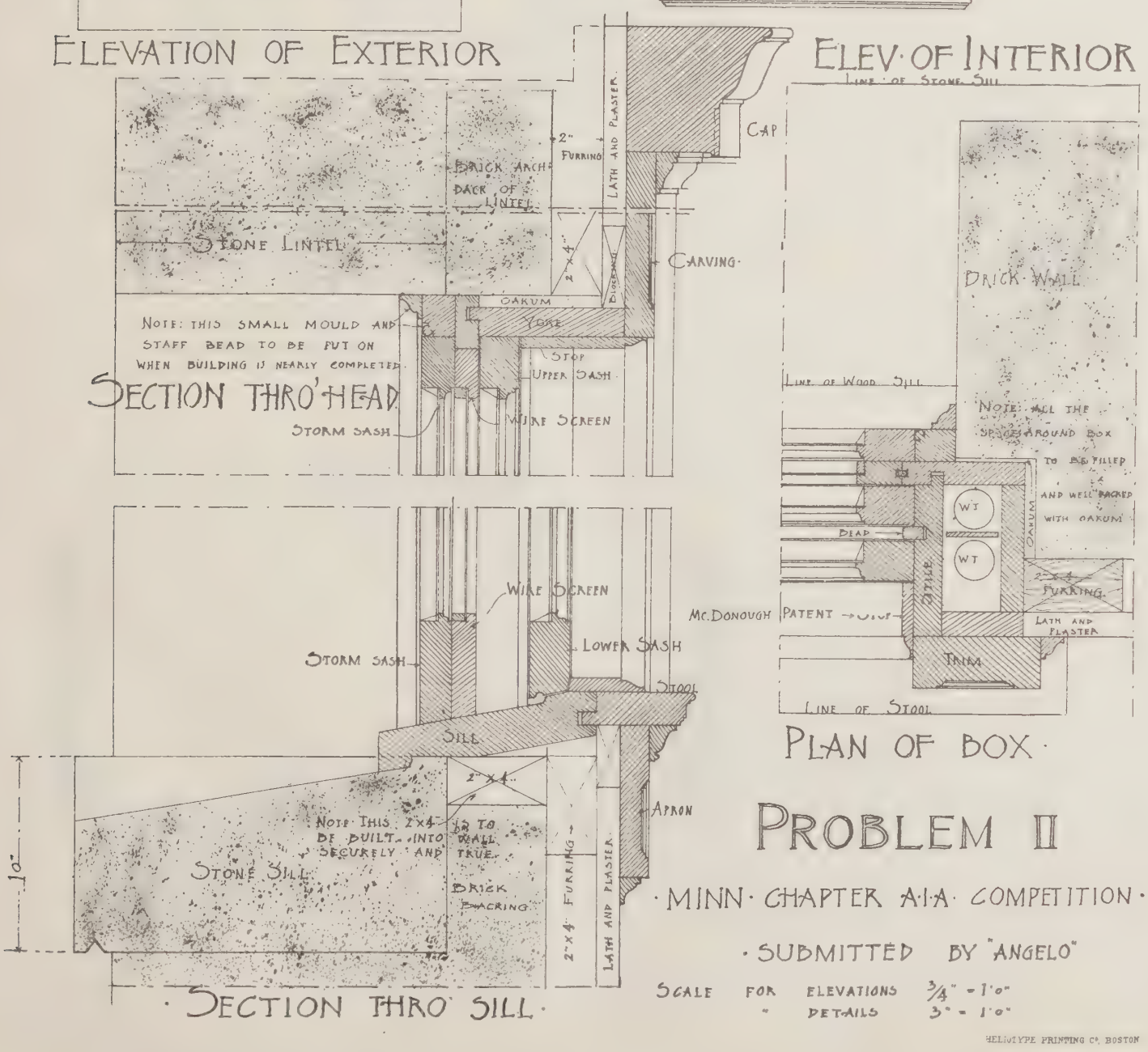
Of course it is entirely unnecessary to carry a gauged arch, such as has been described, through the entire thickness of the wall. All that need be done is to build it to the depth of the window jamb, and then to construct on the inside a rough arch in separate lengths in the ordinary manner.



ELEVATION OF EXTERIOR



ELEV. OF INTERIOR



PROBLEM II

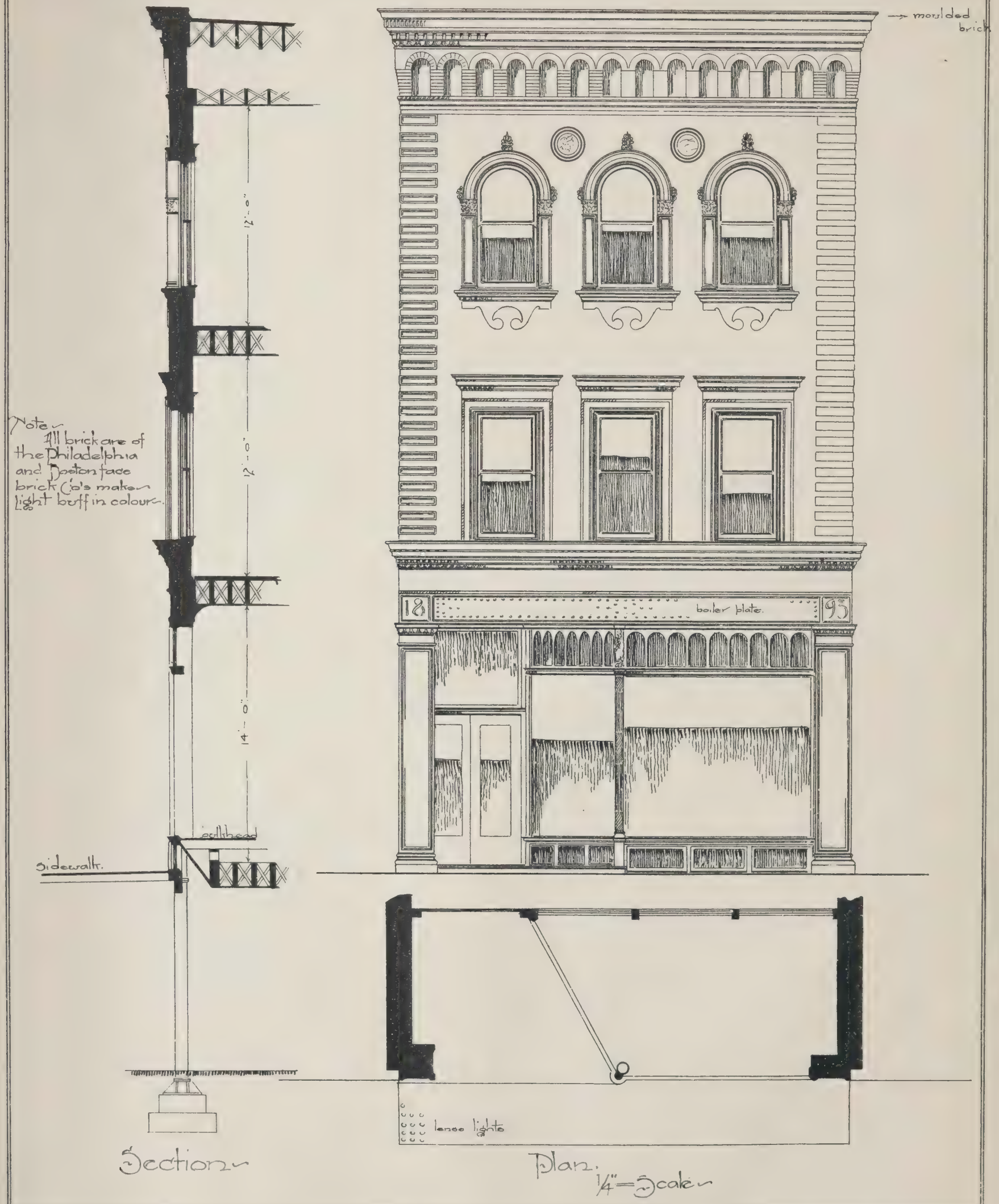
MINN. CHAPTER A.I.A. COMPETITION

SUBMITTED BY "ANGELO"

SCALE FOR ELEVATIONS 3/4" = 1'-0"
" DETAILS 3" = 1'-0"

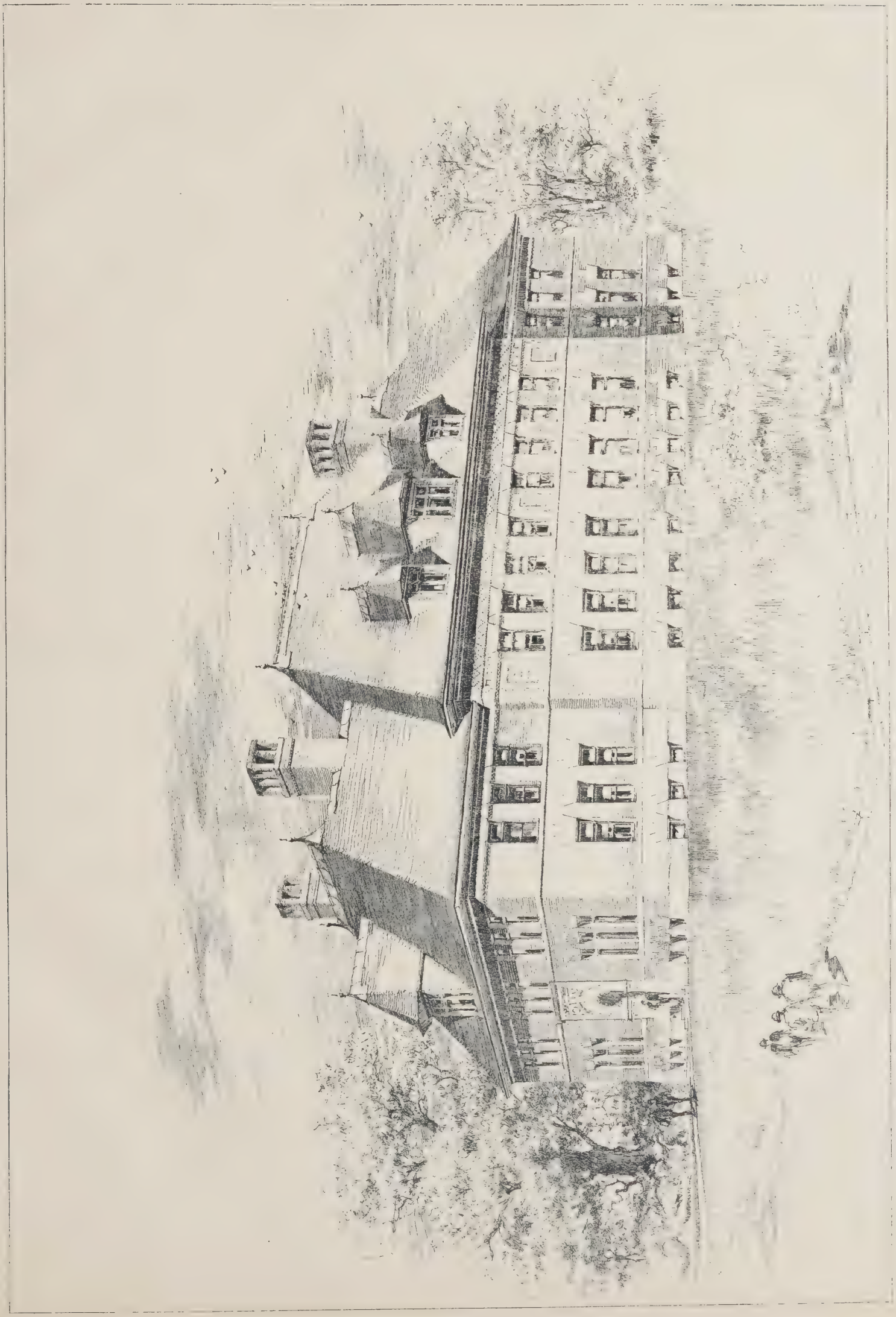
HELIOTYPE PRINTING Co. BOSTON

CONSTRUCTION DETAILS OF A WINDOW. JOHN RACHAC, JR., ST. PAUL, MINN.
FIRST MENTION IN DRAUGHTSMEN'S COMPETITION, MINNESOTA CHAPTER, A. I. A.



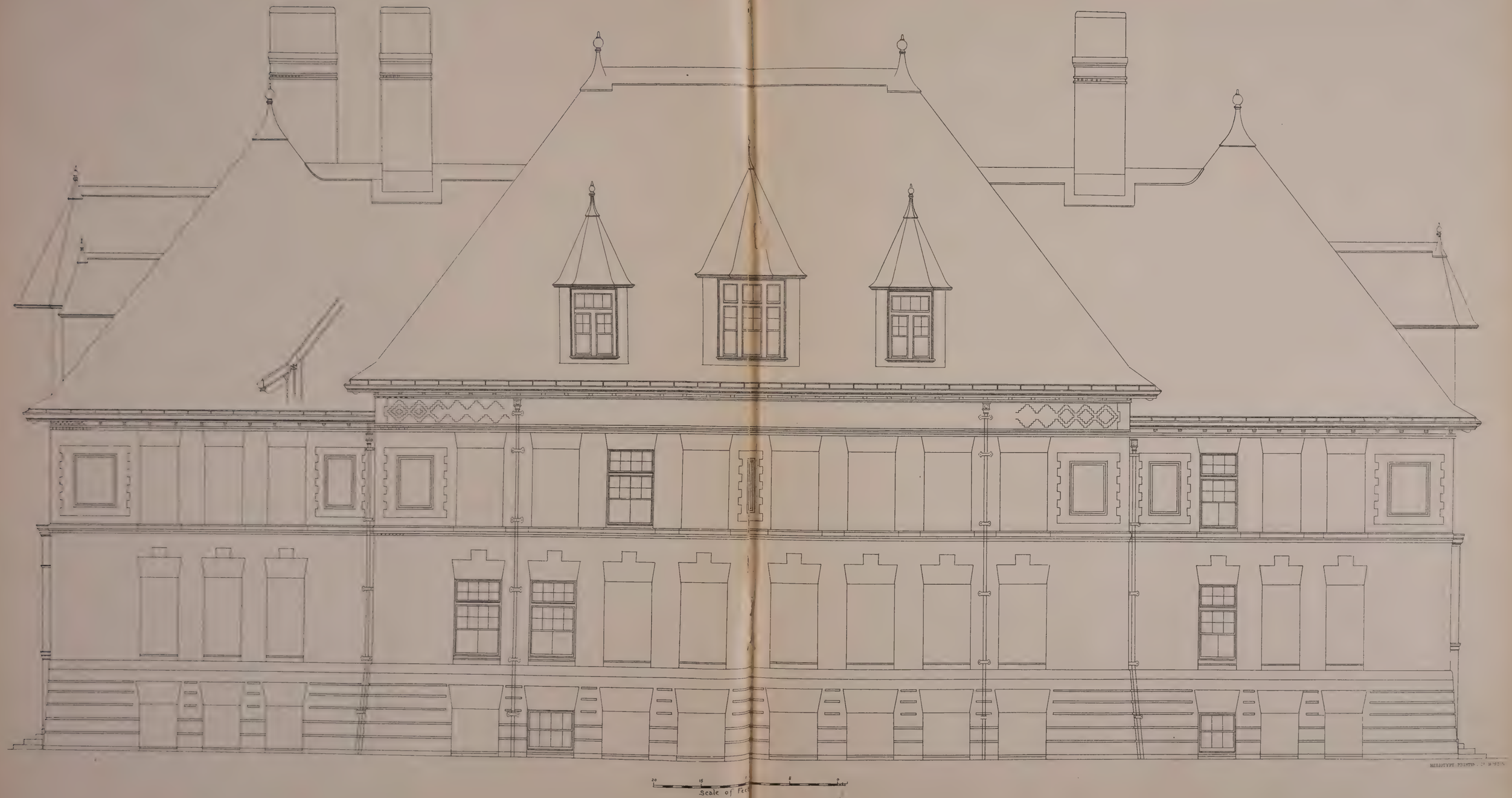
DESIGN FOR A BRICK STORE FRONT, BY FRED NASON, ST. PAUL, MINN.

SECOND MENTION IN DRAUGHTSMEN'S COMPETITION, MINNESOTA CHAPTER, A. I. A.



HIGH SCHOOL BUILDING, ARLINGTON, MASS.

MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.



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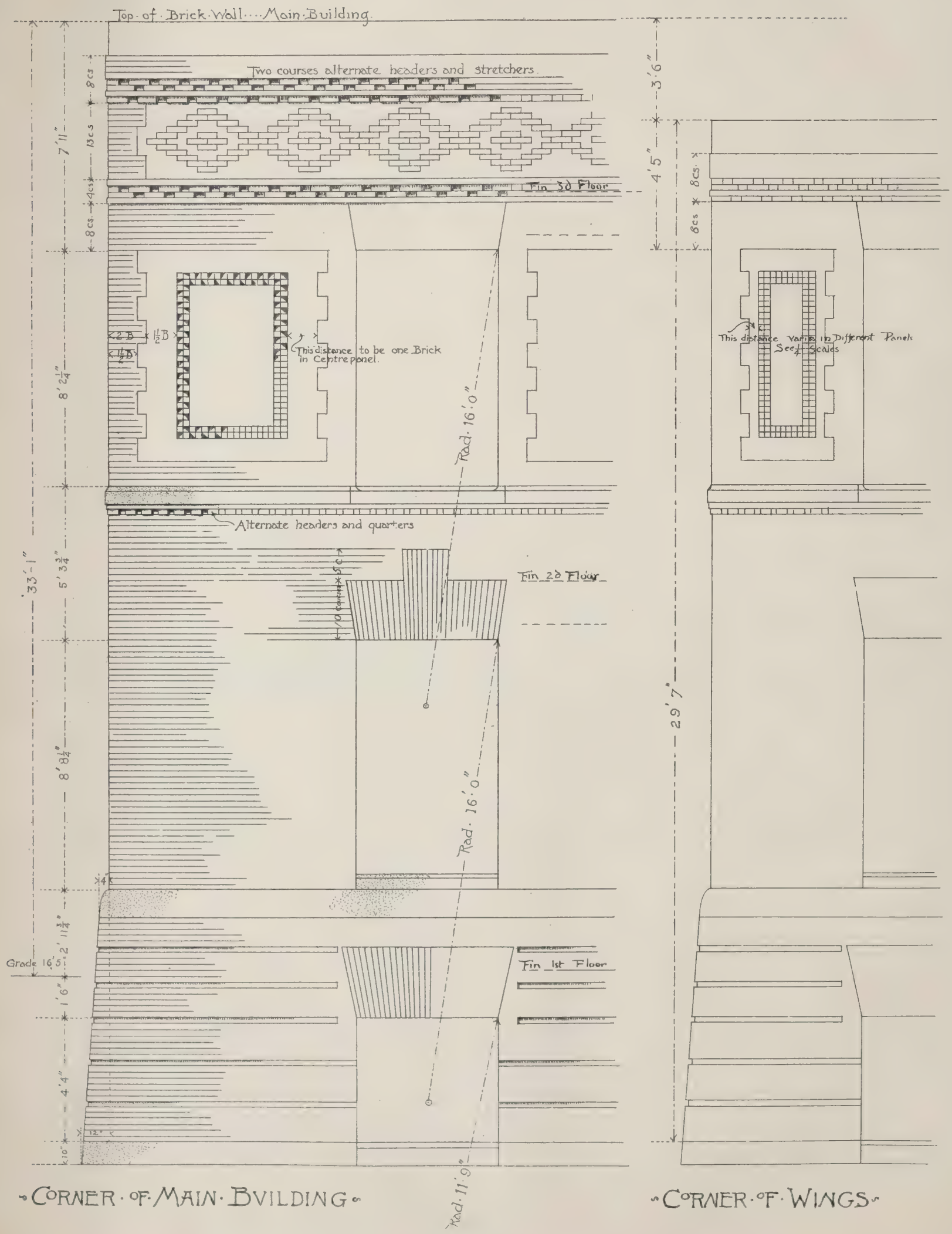
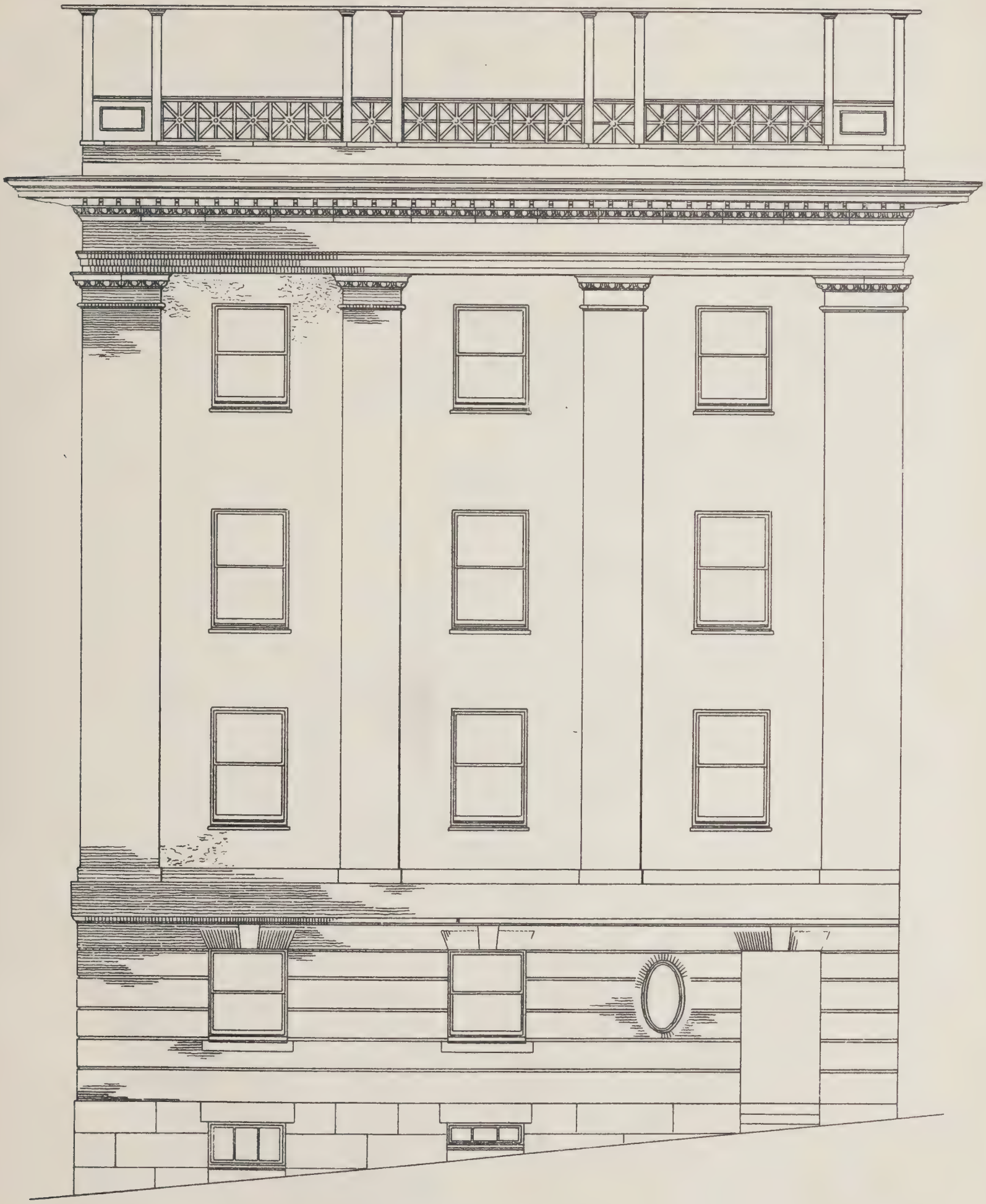


HIGH SCHOOL BUILDING, ARLINGTON, MASS. DETAIL OF BRICKWORK.

MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.



ELEVATION OF APARTMENT HOUSE, BROOKLINE, MASS.

MR. A. S. JENNEY, ARCHITECT, 3 HAMILTON PLACE, BOSTON, MASS.

"CHARTFIELD" PUTNEY-HILL MESSRS WIMPERIS & ARBER ARCHTS.

HELIOTYPE PRINTING CO. BOSTON

MODERN ENGLISH COUNTRY HOUSE.

REPRODUCED FROM THE BUILDING NEWS, LONDON.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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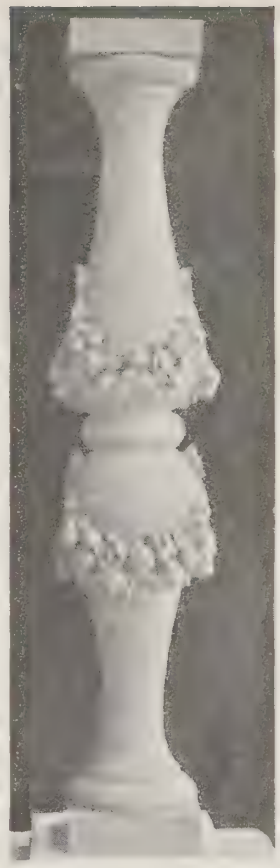
TERRA-COTTA DETAIL BY THE PERTH AMBOY CO., FROM THE BUILDING FOR THE SOCIETY OF SAVINGS, HARTFORD, CONN.

IN a recently issued catalogue the Akron Vitrified Pressed Brick Company takes us to task for being ignorant of the condition of the ornamental brick business in this country, for "complaining of the class of ornamental and shape brick being manufactured, making the claim that all brickmakers turn the old angular designs and do not give the trade shapes that will bring about the beautiful effect of modern architecture." The writer of the catalogue goes on to say, "This illustrates how difficult it is to have people comprehend the fact that we will make any special design that may be ordered. After stating this fact for three years, we still find the leading journal of our brick-building industry, like so many others, still ignorant of this important fact."

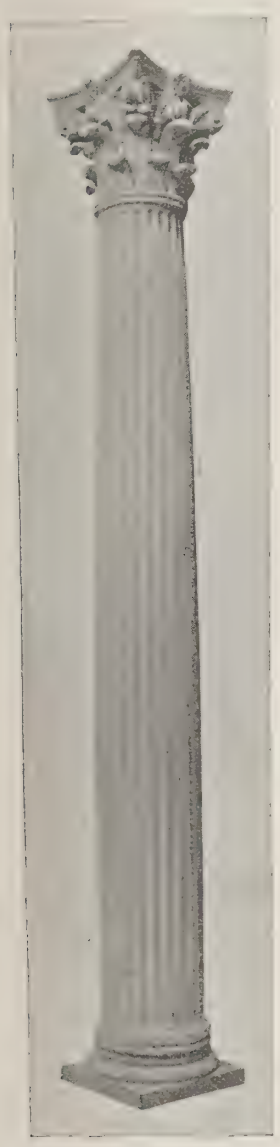
We disclaim any ignorance of "this important fact." We have known all the time that every company stands ready to do this special order work. Our attack was on the stock ornamental bricks, which we say as a rule are execrably bad architecturally. There are one or two exceptions to this rule, but the Akron catalogue before us does not wholly establish that company as one of them. Recognizing the many good points of this company's work, and they are well in the majority, the bad points must be noticed as well. Throughout the catalogue there is evident the principal desire to successfully execute the commissions of architects, and only occasionally do bad slips occur. For instance, we find these remarks: "No style of brick gives as beautiful an effect in buildings as a Rock-Faced"; and "For less money than you can put in common brick and *paint* them, you can get the *Akron Vitrified*, which will never require painting." (Let us hope not.) On the other hand: "Without any more expensé per piece than similar designs following, the architect is invited to furnish his original designs to produce his idea, without reference to the following casts." In many other places throughout the catalogue an expressed desire to execute special order work promptly and cheaply makes this company worthy the consideration of every architect. But, to return to the catalogue subject, some of the cuts only emphasize all we have heretofore said and repeat regarding the majority of stock bricks and their illustrations. We are by no means through with the subject, and, so long as the Akron people threw down the glove, we will, with their permission, present the subject again, with graphic remarks borrowed from their own catalogue, endeavoring to show the difference between an architectural motive well executed and well illustrated, and the same thing badly done.



TERRA-COTTA DETAIL BY THE PERTH AMBOY CO., FROM THE BUILDING FOR THE SOCIETY OF SAVINGS, HARTFORD, CONN.

AN article which has recently attracted considerable attention is that upon "Modern Office Buildings," by George Hill, in the *Architectural Record*. In this the writer specifies in a general way the materials to be used, prefacing his specification with the remark that, while there may be some opportunity for a choice of materials, upon examination it will be found that this choice is much more restricted than generally supposed, there being

certain points in which there is none. He does not attempt to give reasons in his specification, but merely indicates what has been found necessary from experience and good practice. Assuming that the modern office building must be of the steel frame construction, he says:—



"*The walls* should be made with buff brick and terra-cotta fronts and common brick backing for the façades, with the stories forming the basement of stone if desired, although this requires a judicious selection of the stone. The rear walls should be made of common brick and the courts either lined with enamel brick and with the beds and builds laid flat, which would be the case wherever the courts are internal ones, or else painted three coats of paint, finishing with one coat of enamel paint. The facing brick, where a different size from the backing, should have every brick anchored with a Morse Wall Tie as often as the courses fall even. The inner faces of the walls that are exposed to the weather should be furred, using the usual two-inch furring blocks, the usual hollow bricks of Haverstraw size having proved to be a delusion so far as excluding moisture goes."

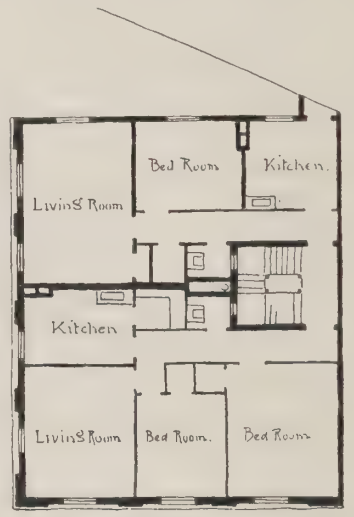
ON this page we publish a photographic reproduction of a remarkable piece of terra-cotta executed by the Boston Terra-Cotta Works. It is a column and capital of the Corinthian order, in white terra-cotta. Never before, to the best of our knowledge, has so large a single piece been successfully made. It is fourteen feet six inches high, including the capital. The shaft is one piece, twelve feet long.

THE ILLUSTRATIONS.

Plate 33. Details of a window frame in a brick wall; size of opening, three feet six inches by seven feet. By John Rachac, Jr., St. Paul, Minn. This drawing received first mention in the February draughtsmen's competition of the Minnesota Chapter of the American Institute of Architects.

Plate 34. A brick store front by Fred Nason, St. Paul, Minn. This design was awarded second mention in the March draughtsmen's competition of the Minnesota Chapter of the A. I. A.

Plate 39. An improved tenement house, to be built at Brookline, Mass., Mr. A. S. Jenney, architect, 3 Hamilton Place, Boston. The plan is here given. The problem was to design flats of two, three, and four rooms that could be rented for a low price. The stairs are encased in fire walls and made fireproof. There is to be a resident janitor to keep the building in good condition. While no baths are to be put in the apartments, first-class bathing arrangements will be prepared in the basement, for use at a nominal fee. The roof is to be made as attractive as possible by a trellis, on which flowering vines will be trained. The exterior is to be treated very simply, yellow or buff brick piers being carried to the cornice, capped with terra-cotta. A terra-cotta bed mould will be run directly under the cornice, which is to be of wood, covered by copper. This broad cornice will protect the walls, which between the brick piers are to be finished with a stucco made of ground brick, the same as the piers.



Sketch Plan of Tenement

Plates 36 and 37. Elevation of Arlington High School.

Plate 35. Perspective of Arlington High School.

Plate 38. Detail of brickwork, Arlington High School. Messrs. Hartwell & Richardson, architects, 60 Devonshire Street, Boston, Mass.

FIFTH ANNUAL COMPETITION FOR THE ROBERT CLARKE TESTIMONIAL

UNDER THE AUSPICES OF
THE CHICAGO ARCHITECTURAL SKETCH CLUB
OF CHICAGO.

CONDITIONS.

The author of each design must execute all drawings without assistance, and non-adherence to these conditions will cause the rejection of the design or designs in question.

The competition is open to architectural draughtsmen under thirty years of age, residents of the United States and not practising architects.

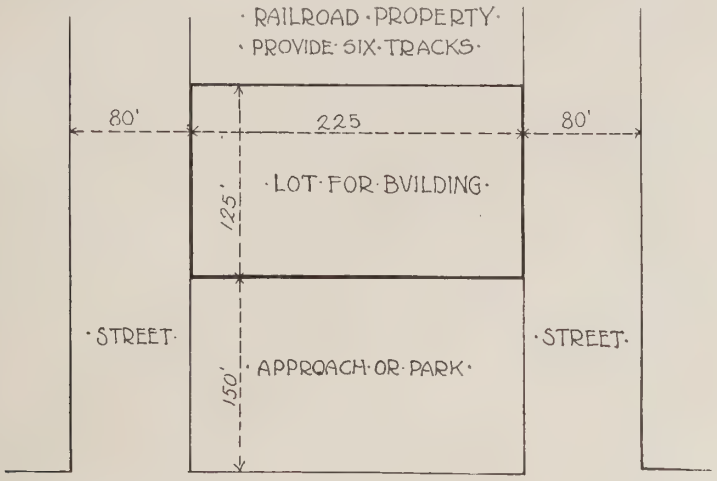
The awards will be made by the Adjudicating Committee on the "Robert Clarke Testimonial" competition, and are,—

First Prize . .	Gold Medal.
Second Prize . .	Silver Medal.
Third Prize . .	Bronze Medal.

The prize drawings are to become the property of the Chicago Architectural Sketch Club.

PROGRAMME.

A design for an elevated railroad terminal station for suburban traffic, in the business centre of a large city.



The building is to have three general stories, the first or ground floor to contain a lobby, stairways, offices, and all necessary conveniences.

The second floor is to be on a level with the platform and to contain one general waiting-room, one waiting-room for women and one for men, toilet rooms, ticket office, depot master's office, and necessary stairway to reach the railroad company's offices on the third floor.

The building can be smaller than the lot outlined on the accompanying diagram, and the space in front is to be used as an approach or park.

The drawings are to consist of the following, their arrangement and the number of sheets being left to the discretion of the competitor:—

First or ground floor plan, second-floor plan, front and side elevations, transverse or longitudinal section, perspective and block plan.

Size of sheets to be 22 x 28 inches.

Plans, elevations, and section to be drawn to a scale of one sixteenth of an inch to a foot, pen and India ink rendering. The perspective to be drawn from an one-eighth scale plan, rendering optional.

The drawings are to be marked with a motto or *nom de plume*, and accompanied by a sealed envelope marked in the same manner, containing the name and full address of the author, with the place and date of birth, and must be delivered flat to Hugh M. G. Garden, Secretary, Chicago Architectural Sketch Club, at the club rooms, 913 Masonic Temple Building, Chicago, on or before Monday, Oct. 2, 1893. Charges to be prepaid. All drawings other than those receiving prizes will be returned at the expense of the contributor.

The Adjudicating Committee on the Robert Clarke Testimonial:—

W. L. B. Jenney, Chairman.
Samuel A. Treat.
Chas. A. Coolidge.
D. H. Burnham.
Lorado Taft.

PATENTS.

A MONTHLY LIST OF RECENT PATENTS GRANTED, WHICH CONCERN THE CLAY-WORKING AND THE BUILDING INDUSTRY, REPORTED SPECIALLY FOR THE "BRICKBUILDER," BY H. M. STERLING, ATTORNEY AT LAW, WASHINGTON D. C.

Method of and Machinery for Operating the Pressing Plungers of Brick Machines. J. C. Anderson, Highland Park, Ill. June 20, 1893. No. 500,047.

Tile. Charles R. Lamb, New York, N. Y. June 20, 1893. No. 499,743.

Reciprocating Brick Machine. William Johnson, Leeds, England, assignor of one half to the Somerset & Johnsonburg Manufacturing Company of Pennsylvania. June 13, 1893. No. 499,230.

Brick-Mould Sander. James A. Buck, Crescent, N. Y., assignor to Francis C. Buck, same place. June 13, 1893. No. 499,206.

Roofing Composition. G. H. Blake, Portland, assignor of one half to James N. Winslow, Deering, Me. June 6, 1893. No. 498,840.

Metallic Roofing. William R. Kinnear, Columbus, O., June 6, 1893. No. 499,024.

Brick Kiln. Robert Garrett, Freedom, Pa. May 30, 1893. No. 498,642.

A SUGGESTION FOR CATALOGUES.

CLAY workers, engaged in the better class of work, will find the new catalogue of the Winslow Brothers Company, at Chicago, illustrative of the remarks we have made in regard to proper catalogue work. It is the sort of thing that is effective among architects, illustrating as it does the best work the company has executed under architects' direction. The subjects are photographs reproduced in gelatine, and of the 141 plates, 23 are devoted to stairways and balconies, 17 to railings, 29 to elevator enclosures, 2 to 12 designs for elevator cars, 2 to panels, medallions, etc., and 63 to counter railings, entrances, canopies, and other miscellaneous subjects. The same opportunity is open to brick or terra-cotta makers, to produce a catalogue that will be kept as a work of art. For fine illustrative work, terra-cotta or good brickwork is equal to wrought iron. Of course such a catalogue is expensive, but there can be no doubt that it is an investment of the most profitable kind.

A WHITE BRICK.

FOR some time there have been several "white" bricks upon the market, but these have presented two objections,— their whiteness was obtained at the expense of hardness, by underburning, or they were burned hard and came out anything but white. A company has

recently been formed for the manufacture of a hard-burned white brick, and samples already made hold out every promise of success. This company, the White Brick and Art Tile Company, has for its president Mr. Charles Siedler of the Lorillard Brick Company; and Mr. Elterich, who has long been associated with successful work in tile manufacturing, is connected with the work of production. The brick is a dead white. It is almost vitrified, so hard is it burned, and when broken shows a texture much like white marble. It is made of porcelain clay, and tests show it to have great crushing strength. Its permanent white is also an important quality, as it will not discolor when exposed to the atmosphere. Three sizes are now made. The largest size is $8 \times 3\frac{3}{4} \times 2\frac{3}{8}$. Next comes a slightly smaller brick, $8\frac{1}{8} \times 3 \times 1\frac{3}{4}$. The third size is $8 \times 3 \times 1\frac{1}{2}$. One criticism we would make in these sizes is that the width should be four inches. This increase in size would not make the brick much more expensive to manufacture, and it would be far cheaper than the mortar necessary to make up the difference. The building laws, in stipulating the thicknesses of walls, take into consideration the ordinary size of brick, and in using white brick facing the above sizes make it necessary to fill in one inch at least with mortar.

The price has not been definitely fixed, but their use will cost much less than stone. These bricks have already been ordered in advance of the production, and are specified for interior work of all sorts.. A small flooring tile of the same material is also manufactured by the new company. The offices are at 92 Liberty Street, New York, and 11 Doane Street, Boston.

WESTERN BRICK IN AN EASTERN MARKET.

SALESMEN of front brick in the New England market must now recognize in the Columbus, O., Brick and Terra-Cotta Company a strong competitor, not only in point of quality of the goods, but in quick delivery. This company, well known throughout the West, makes a very fine line of front brick, especially buff and terra-cotta brick in all shades. They are ably represented in the New England field by Mr. W. H. Gates of 30 Kilby Street, Boston, whose general specialty is "clay products." While Mr. Gates is after orders for anything in the line of clay building materials, he desires most to bring these front brick and the Akron vitrified roofing tile to the attention of architects. The enormous stock constantly carried by the Columbus Brick and Terra-Cotta Company enables him to promptly fill all orders for front brick, and he can as quickly supply orders for roofing tile. Architects who think roofing tile too expensive to use will find it to their advantage to communicate with Mr. Gates and let him give a price. It costs nothing, and the architect may discover that a tile roof is possible after all.

A full line of samples can be seen at Mr. Gates's Kilby Street office. To the building trade he stands ready to supply lime, cement, terra-cotta, sewer pipe, fire-proofing, chimney flues, wall and floor tiles, fire brick and fire clay, at prices that will compare favorably with any in the market.

THE capacity of the works of the Clinton Metallic Paint Company at Clinton, N. Y., has been largely increased during the past winter, until now, if we are correctly informed, this company is the largest producer of red metallic paint in the United States, while their mortar color department finds difficulty in keeping abreast of orders. As the company was organized some six years ago, the fact that they have made such rapid advance is significant. The excellence of their products has always been acknowledged by the progressive and practical portion of the trade, and their present position among the largest manufacturers in their line would indicate that the trade at large now recognizes the value of this company's brand on a package.

THE Sayre & Fisher Company have entered the New England field, and as an introduction have expressed to the offices of architects cases of their various styles of front brick. In New York this company is well known, having furnished the bricks for many of the finest buildings there. A notable example is the building of the New Jersey Central Railroad Company, the architects of which are Peabody & Stearns of this city. Mr. Charles Bacon, 3 Hamilton Place, who has been looking after the New England interests of the New York Architectural Terra-Cotta Company, has taken the Sayre & Fisher agency.

A STEADY stream of attractively printed pamphlets issues from the office of J. W. Penfield & Son, Willoughby, O. This time it is "With the Brickmakers," a collection from various "authors" who have used and expressed their satisfaction with the Penfield Auger Brick Machinery. As usual, no expense is spared in the printing.

AS OTHERS SEE US.

"I enclose check for $2.50, one year's subcription to your admirable journal, of which I have received a sample copy.

"You are filling a field heretofore but partially covered and I am glad to add my testimony to your efforts."

THOMAS P. LONSDALE, Architect,
4th and Walnut Streets, Philadelphia.

"I have always awaited the arrival of your paper with great interest, because it is always full of valuable hints and helps."

F. CARL ALTMANN, Architect,
Nashville, Tenn.

"While greatly pleased with your publication, I have no immediate suggestion to make."

T. A. DUNGAN,
Chicago, Ill.
Manager for Charles A. Moses, general contractor.

THE BRICKBUILDER

VOL. II. BOSTON, JUNE, 1893. No. 6.

THE ORNAMENTAL TREATMENT OF BRICKS AND IRON.

BRICK, unlike iron, is an old building material, evidence existing that it was used in the time of the Egyptians, though at present little other than traces of Roman work exist. The early Egyptians and Greeks used stone in all works of a prominent nature where permanence and durability were aimed at, and the bricks by them were used more generally for smaller works. The brick of to-day has, however, changed very much, both in the method of production and especially in quality; and again, we moderns find it so well suited to grapple with considerations in construction which were never thought of by the ancients; hence we may fairly consider it a modern article, if not in itself at least in the manner in which it is constructively treated. The Romans used the brick to form a body to their walls and then covered the surface with marble or other stone slabs or tiles; and here began the system which is carried to such extremes at present. Brickwork reached a very satisfactory condition in the Middle Ages, and some of the works of that period show that careful consideration was paid to the preparation of suitable designs; however, neither the treatment adopted by the Egyptians, Romans, nor any of the mediæval work is safe to imitate at the present, because, naturally, as time goes on, convenience and different requirements in setting out the buildings vary so much.

The abominable practice of covering the edge faces of the brickwork with a rendering of cement stucco has obtained a great hold, and too much cannot be said in severe condemnation of the practice; and it is by the aid of this habit that result the cases of wretched deception before referred to. In many buildings it is a common method to cover a really good and thorough brickwork execution with this cement jacket, and mark out with all the joints and other attendant features of solid stone, and plant on everywhere possible overdone cast cement ornament, and in some cases the deception is enhanced tenfold by painting and sanding in direct imitation of stone. All this, then, tends to debase brickwork, for when the knowledge exists that the outside is to be covered and hidden but little attention is given to the facial appearance of the bricks and the method of laying them. When the general advantages of exposed brick surfaces are considered it is surprising that more attention is not given to their adoption. The impervious and vitriolized surface of a hard, well-burnt brick is very little affected by the acidulating action of smoke and other fumes peculiar to cities and by the wearing effects of the weather, against all of which both ordinary stone and stucco are weak as a defence. And again, the brick is a material that is eminently suited for construction on account of the facility with which it lends itself to the awkward complications and broken-up nature of our modern buildings; nor can it be doubted that brick in conjunction with terra-cotta will be a large factor in the buildings of the future. As far as expense is concerned, bricks exposed are much less than stone and very little more than stucco. It should therefore be the duty of the designer to make the external appearance and the surface suitable to and in harmony with such construction. Boldness of form in which the brick is collectively considered should be relied upon rather than a frivolous ornamentation in which the brick is more individually apparent. The builder has at his command such improved methods of economically operating in late years, and as there is every chance of its improvement, it would seem that there is nothing to deter the designer from exercising more courage in setting out bold features, the economical execution of which in olden times would have been a deterrent consideration. The Romanesque would seem to be a good model on which to found a design embracing a more characteristic use of the brick. There is in this style something which is strikingly bold, and by making the arch features more apparent, piers rather than columns, together with rejection of the smaller detail ornament, which crept into the late examples, and by a judicious unity in execution, at the same time making all materials – as, for instance, iron — fulfil their part in a harmonious manner, something more simple and more just to ourselves might be produced.

There have been erected recently in Sydney two notable examples of exposed brick surfaces, and one in

particular has a most disappointing appearance; the whole effect is oppressively flat and monotonous, brought about by the entire absence of any boldness of proportion, especially the mouldings of the strings and cornices, which are so ill-proportioned as to be hardly perceptible on the opposite side of the street. There can be no doubt that failures such as these have a very bad influence on the progress of the use of bricks. The work throughout was all that could be desired, as will be understood when it is stated that the facing joints did not exceed a quarter of an inch, and the bricks were not gauged or rubbed, but hard, double-pressed, as they had left the kiln. To an observer interested the lesson given by this example points out that if an effective result is desired it is most necessary that the design shall not rely upon small and insignificant moulds (good work notwithstanding), but rather upon the shaping of parts of the actual building into such forms as will insure effect in proportion, as will be seen in the case of the other of the buildings referred to, which has been treated in a bold manner by an execution in Romanesque. The piers and the fine arches, together with striking breaks and formations in the wall surfaces, and the attention given to color harmony, cause one when looking at it to forget the brick as an atom and think only of the magnificent whole formed by its use. The knowledge is present to the most simple that it is brick, but there is, coexistent, the impression that the effect is excellent. In this case the architect has given some considerable attention to detail, of course rendered necessary by following closely the style; but it is not too much to say that had most of the detail been omitted the design would not have suffered.

The nature of the modern brick, on account of its hard and finished surface, renders it necessary to impress the mould before being burnt; and so far so good, for it is most desirable that the whole surface, plain and otherwise, of the buildings should be uniform, which would be a matter of impossibility were the attempt made to carve, cut, or rub any particular portion, for which bricks less hard would have to be provided. But in this method of previous impression, advantage is taken of the easy method of production to indulge in excess, and the abomination of small and insignificant mouldings is the result. Mouldings which cannot be seen are abortive and useless in any material, and in this case what can be got in the brick itself cannot be carried out when laying it, and nothing looks worse than lines of moulding not perfectly straight and horizontal. The only remedy that remains when such occurs is to straighten up as much as possible by the aid of tuck-pointing. The only logical method of using bricks for mouldings is to treat them as part of or one member of the mould, than to endeavor to get two or three members in each course of bricks. All attempts at the execution in brickwork of the classic orders with columns and entablature should be avoided, and the massive detail rendered necessary by the adoption of the Renaissance renders failure certain unless a plentiful mixture of stone is used, which is not always possible.

Color is a question that requires a great amount of attention when designing, and some of the huge mistakes which almost every city can complain of in the way of glaring examples of red walls lavishly interspersed with bands and all kinds of geometrical patterns in white brick should certainly be things of the past. There can be no doubt that in this particular some advance will have to be made in a general manner by the manufacturers, but it is very certain that none will take place till a firm demand is made by the designer; in fact, none can be expected if the user is content to manage with the result of a loose system, which, as far as color is concerned, depends merely on what the clay likes to give. It must be confessed that the advance made in controlling the color return has been nothing compared with what has been done in the fast production of a hard and well-shaped brick; and yet each is equally important, and the end will not be reached till such is universally accomplished. By the aid of a little chemical science the clay might be treated in a manner capable of producing any of the ordinary tints; and there is no doubt that, if the makers were convinced that the production of such was in their interests, the want would soon be satisfied. It should always be remembered that those who help to make a city dull and oppressive by smoke-covered stone and sombre and crumbling stucco, and fail to take advantage of the chance to liven and beautify by the use of inviting colored material, are to a great extent responsible for that absence of artistic feeling among the lay portion of the people which is so depressing. Nothing could give greater pleasure than tastefully selected and harmonious colors in architectural work, and it would be difficult to find a better means of artistically educating the people.

Extract from a paper read before the Engineering Association of New South Wales by Mr. James Nangle, and published in the Australasian *Builder*.

MORTAR FROM BRICKS.

MORTAR for resisting the action of fire, and proper to be employed in building slight brick piers as substitutes for or instead of employing iron columns, may be made of pozzolano mixed with fresh-ground lime or chalk from the lower beds; and as real pozzolano is an imported substance, and likely to be expensive, its place may be very well supplied by an artificial substance of similar character, produced by burning any marly clay that is fit for brick-making to a gray clinker, and reducing such clinker to a grain of the size of coarse sand. Three fourths of this substance to one fourth of fresh-ground lime, mixed dry in the first instance, and when so mixed rendered plastic by the addition of soft water, will yield a mortar capable of resisting fire for a long time, and water, if need be, as long as any bricks that can be set in it. The same mortar would be excellent for ceilings, if time can be allowed for the setting as the work goes on; but care must be taken in using it for such purpose to guard against the consequences of its expansion in setting.— *British Clayworker*.

TERRA-COTTA AND FAIENCE AS MATERIALS FOR ARCHITECTURAL AND DECORATIVE APPLICATION.

(*Continued from May number.*)

A QUESTION of the utmost importance in connection with the use of terra-cotta is its comparative cost. This is determined partly by locality, and partly by the quality of workmanship. In districts in which good stone is abundant and readily accessible, and to which terra-cotta would have to be imported from any distance, it would probably be an open question as to the comparative cost for constructive use; but this general view is subject to large modification, and is subject to the character and extent of the structure, the proportion of repetition in the details of the design, and the quantity of mouldings and enrichments. If, on the other hand, both the stone and terra-cotta have to be imported, the probabilities are very decidedly in favor of terra-cotta being the cheapest; but the general proportion of cheapness will again be determined by the conditions I have just named. The element of cheapness in terra-cotta depends primarily on the extent to which each block can be repeated. Whether few blocks or many are required, the cost of making models and moulds has first to be incurred and calculated, and if it can be distributed over a large number of blocks, the cost per cubic foot is considerably reduced. If, on the other hand, only a few blocks are required of any certain form, the cost of models and moulds must be rated against them adversely. Sometimes, however, this is not so formidable a matter as would at first appear, and much depends upon the nature of the details, and the practical way in which the work is designed and subsequently set out. It is often possible to introduce considerable variety in some directions without any appreciable increase of cost in model-making; whilst, on the other hand, a design may embrace almost the minimum of variation, and yet involve large additional cost. On such points it is very desirable that all architects should possess, as some do, a practical acquaintance with the mode of manipulation, in order to secure the best results; or, as in alternative, that they should elicit some practical suggestions on the subject in elaborating the details of the design, or in making the working drawings.

From what I have said, you will at once see that it is difficult to name any general price for which terra-cotta work can be executed per cubic foot without reference to the structure for which it is required. It varies from about 4*s*. per cubic foot to double that sum, according to circumstances and the nature of the details. It may even run up to a very much higher figure than this, and still be considerably cheaper than stone for the same work. The same general principles govern the comparative cost of terra-cotta in a modified form. When applied more specifically as an enrichment, it is less necessary to take the question of distance into consideration, and in many forms of enrichment it is possible to secure great variety of design by a judicious use of existing models. There are many instances in which this can be done in complete harmony with the artistic and architectural character of the structure, and if the designs are good ones and well modelled, a little skilled adaptation will often enable an existing model to be turned to account at very much less cost than would be involved in the special preparation of a new one. If, however, for important structures original modelling is required, I believe it will be found that in most cases it is decidedly cheaper than stone or brick carving of a similar character.

Of course there are all degrees of modelling as there are all degrees in carving, from very good to very bad; but taking really first-class work in spirit and execution as the basis of calculation, it is safe to say that terra-cotta will cost least, even in cases in which there is little or no repetition, whilst if there is repetition the difference in cost soon becomes considerable.

The use of terra-cotta for enrichment, in the form of bands, strings, small patteræ, diapers, and similar forms has stimulated the production by machinery of a number of hard cast-iron-looking designs, more or less geometrical or conventional, which have found some favor by reason of their low price; but many of these things cannot be considered as good artistic work, and I, therefore, do not venture to include them in any calculation of comparative cost; they rather rank with brickwork. I have instituted no comparison between the cost of brickwork and terra-cotta, because it is obvious that brick is decidedly the cheaper form of burnt clay, and may often with great propriety and economy be judiciously used constructionally in conjunction with terra-cotta, either according to the original conception of its use by the Italian revivalists, or in more modern forms.

The decorative application of terra-cotta faience is so closely allied with terra-cotta, that it will not seem out of place if I now ask your consideration for a few minutes to its special features as a decorative material. The term implies a French origin, and as you are no doubt aware was originally applied to a glazed pottery, of somewhat stronger and heavier character than ordinary pottery, made at Fayence. The term is still used in France in its original signification, but has gradually been applied in a more general sense to many forms of decorative glazed ware, and has been adopted as a not unsuitable and fairly descriptive term to a material that might also be called glazed terra-cotta had not that term been previously adopted for a material without much character, and without beauty of either form or color to recommend it. Under the general descriptive term of Burmantoft's Architectural Faience is included all forms of terra-cotta, constructive or decorative, for exterior work, and also many special forms of the faience now introduced and very favorably received by the profession for interior application. The material itself may be described as a ware of finer and closer grain than terra-cotta, manipulated by practically the same process, and brought into the desired form by an elaboration of the methods applied to high-class terra-cotta.

To give it increased hardness and character, it is, however, fired at a much higher heat, and being composed of very pure and clean raw material, it is capable of receiving any color, either by the body of the material being mixed with various oxides requisite to produce the desired results, or by being covered with colored metallic glazes with a similar object. By both these methods, adopted alternately, according to the object to be attained, a very hard, durable, and beautiful material is produced, eminently adapted for working out, in a permanent and artistic form, both the simplest and most elaborate varieties of architectural decoration.

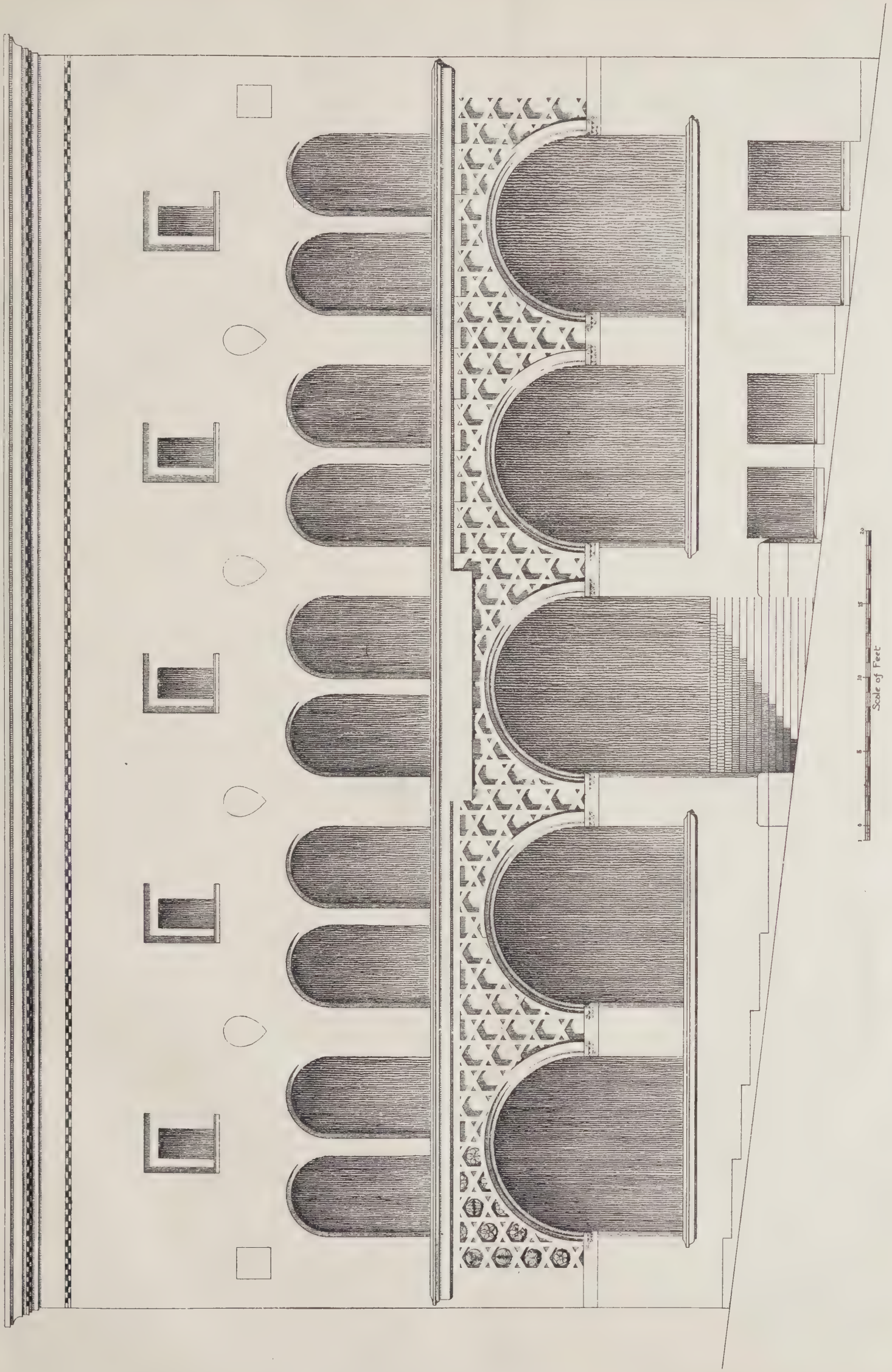
The specimens of the material now submitted to your judgment will, I think, bear me out in these remarks, and will render it unnecessary for me to add further description. I might, however, add that in bringing these specimens before you, I do not claim for them any further novelty than they possess. They illustrate, in fact, the modern application of a process as old or older than history to modern designs and uses, and in a more complete and elaborate form, and this is all that can fairly be claimed for Burmantoft's faience. It is, in fact, the modern form of the enamelled bricks of Babylon and Nineveh, of which we still possess elaborate remains; of the Italian enamelled work, in which men like Lucca del Robbia excelled many centuries ago. It differs from tiles, inasmuch as it combines constructional uses as well as decorative, or can be applied simply in a decorative form; and it differs from most modern forms of tiles, also, in that it is manipulated on the plastic principle entirely, and is therefore much more capable of being readily applied to any desired form and to any design, by the intervention of elaborate mechanical appliances. The beauty and mellowness of the design is not lost by transference to metal, and every minute touch of the artist can be made to tell either upon a small tile, or in a large block.

The mode of its application I can safely leave in your hands and in the hands of the profession at large, to whose ready appreciation of an effort to contribute to the range and quality of architectural material, it gives me the sincerest pleasure to make respectful recognition. I may be permitted to add but one remark. The use of color in exterior architectural designs is, no doubt, a question of some difficulty. Many attempts have been made to secure satisfactory results in that line, and there have been many failures. For thoroughly harmonious effects, it unquestionably requires the eye and skill of a thoroughly competent artist, and some practical experience of the material to be used. In England, at least, we are probably not prepared for our atmospheric or natural surroundings, for the wealth of color so charming and harmonious to the eye under brighter skies; but no one not an hypochondriac can, with any propriety, aver that we are not open to very considerable improvement in this respect, or be unready to welcome the judicious and tasteful use of such materials as improved methods of manufacture and increased scientific skill place at the disposal of the architect and builder.

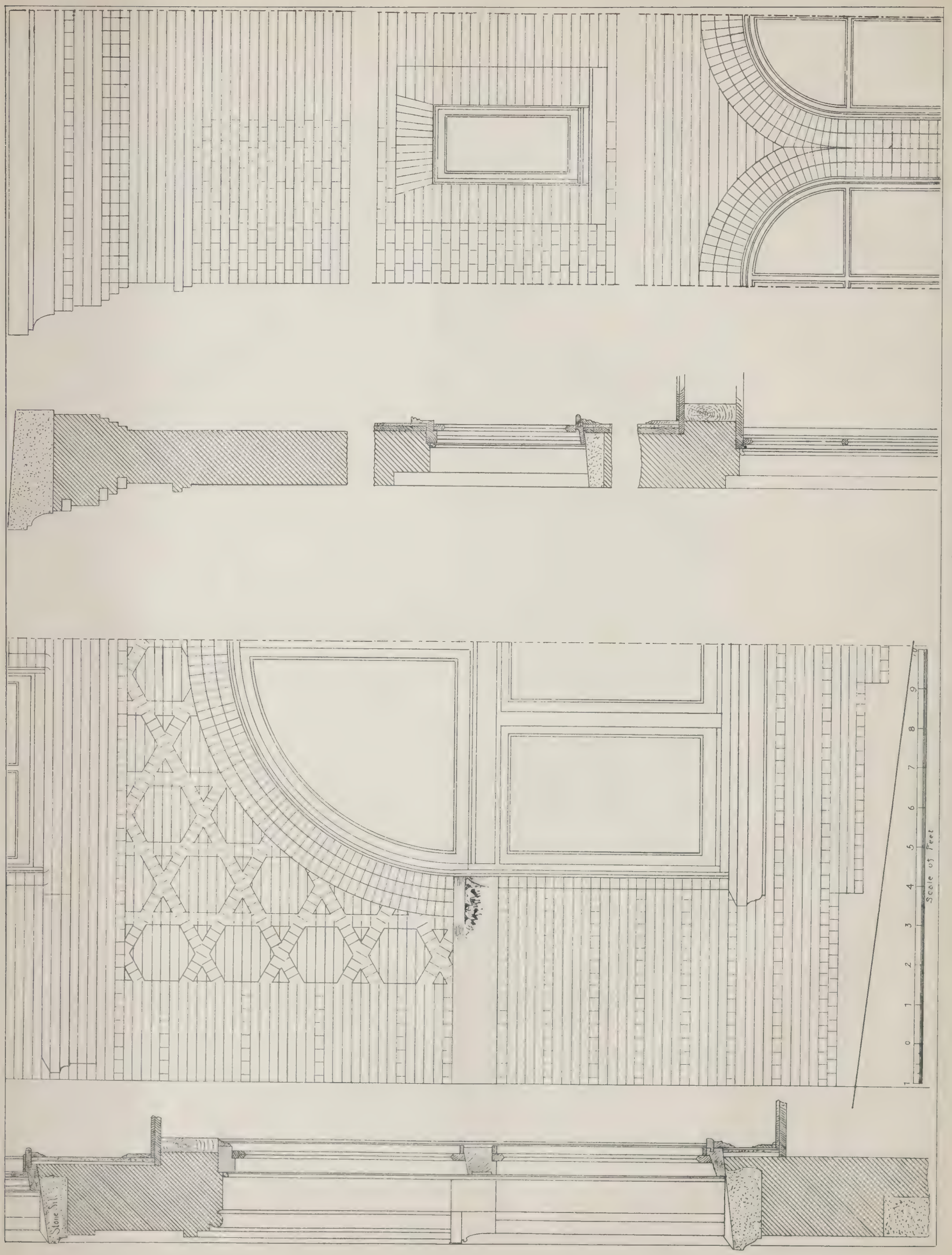
BUILDING FOR THE TRUSTEES OF THE DR. CULLIS ESTATE, BOSTON.
J. Williams Beal, Architect, Boston.
Brick and Terra-cotta by the Boston Terra-Cotta Company. See page 62.

(*To be continued.*)

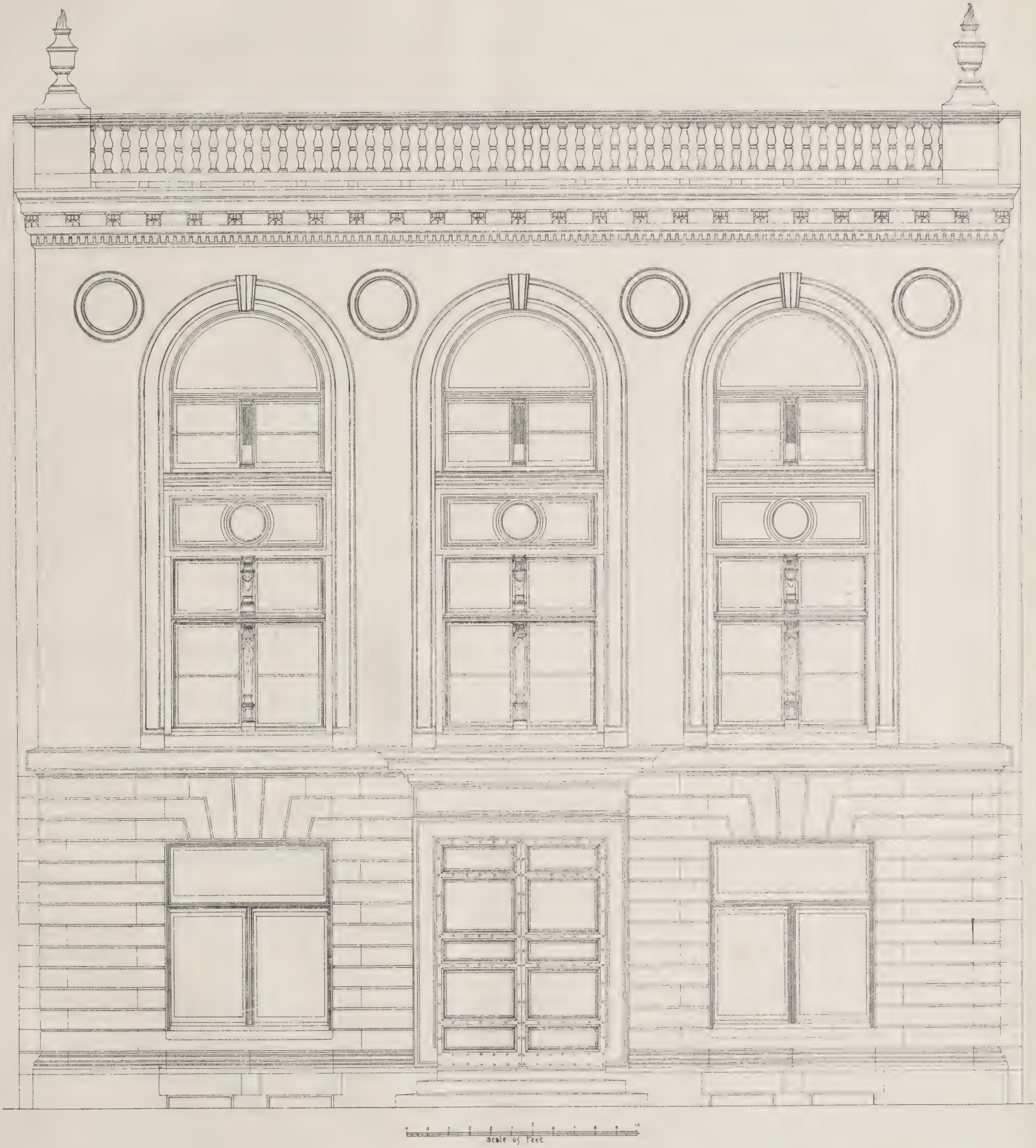
Mr. W. R. Hargis, Edinburg, Ill., would like information concerning the making of cement and concrete pavements from firms manufacturing cement suitable for such work.



RHODE ISLAND SCHOOL OF DESIGN, PROVIDENCE, R. I. ELEVATION TO ONE-EIGHTH INCH SCALE.
ANDREWS, JAQUES & RANTOUL, ARCHITECTS, BOSTON



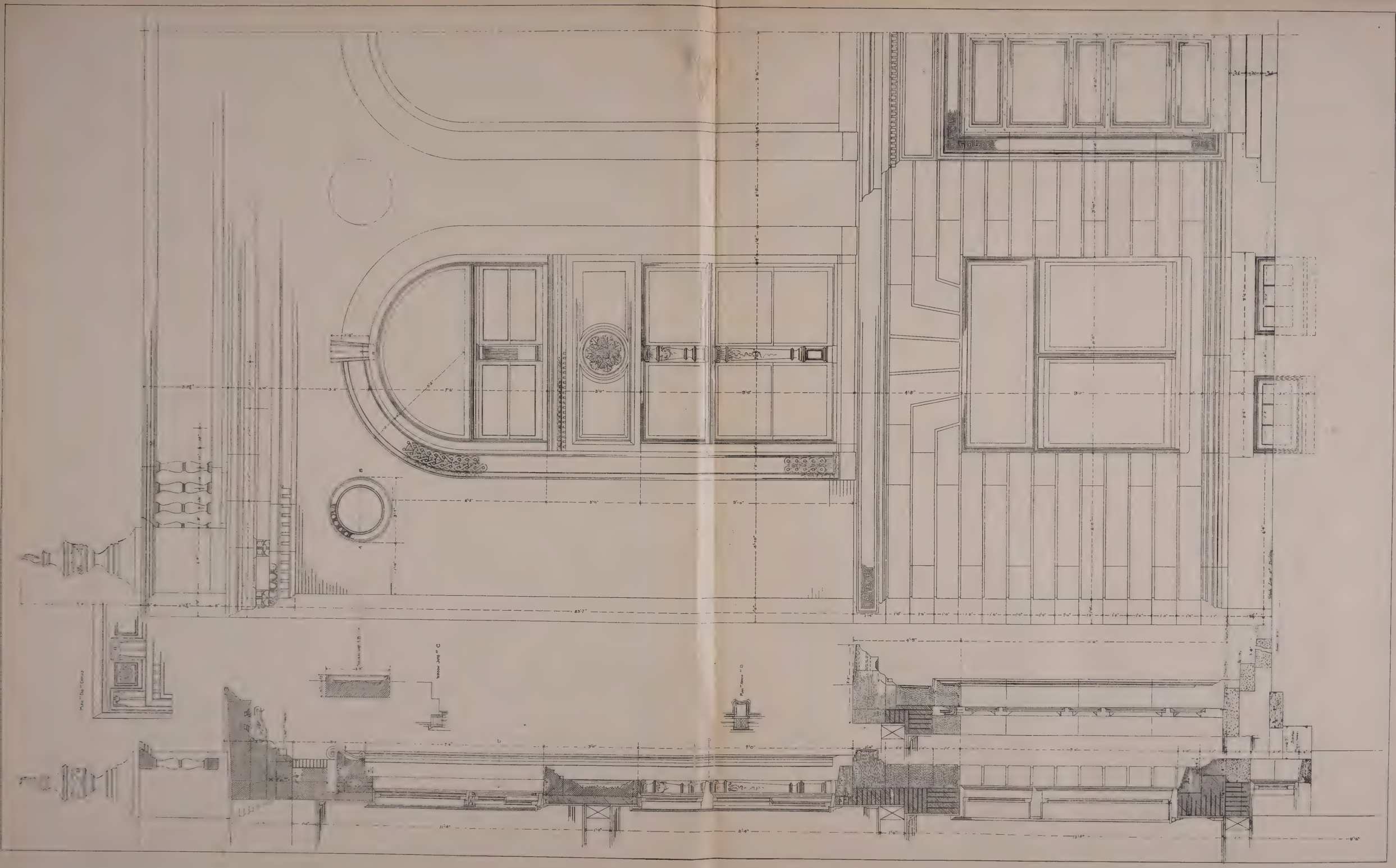
RHODE ISLAND SCHOOL OF DESIGN, PROVIDENCE, R. I. DETAILS.
ANDREWS, JAQUES & RANTOUL, ARCHITECTS, BOSTON.



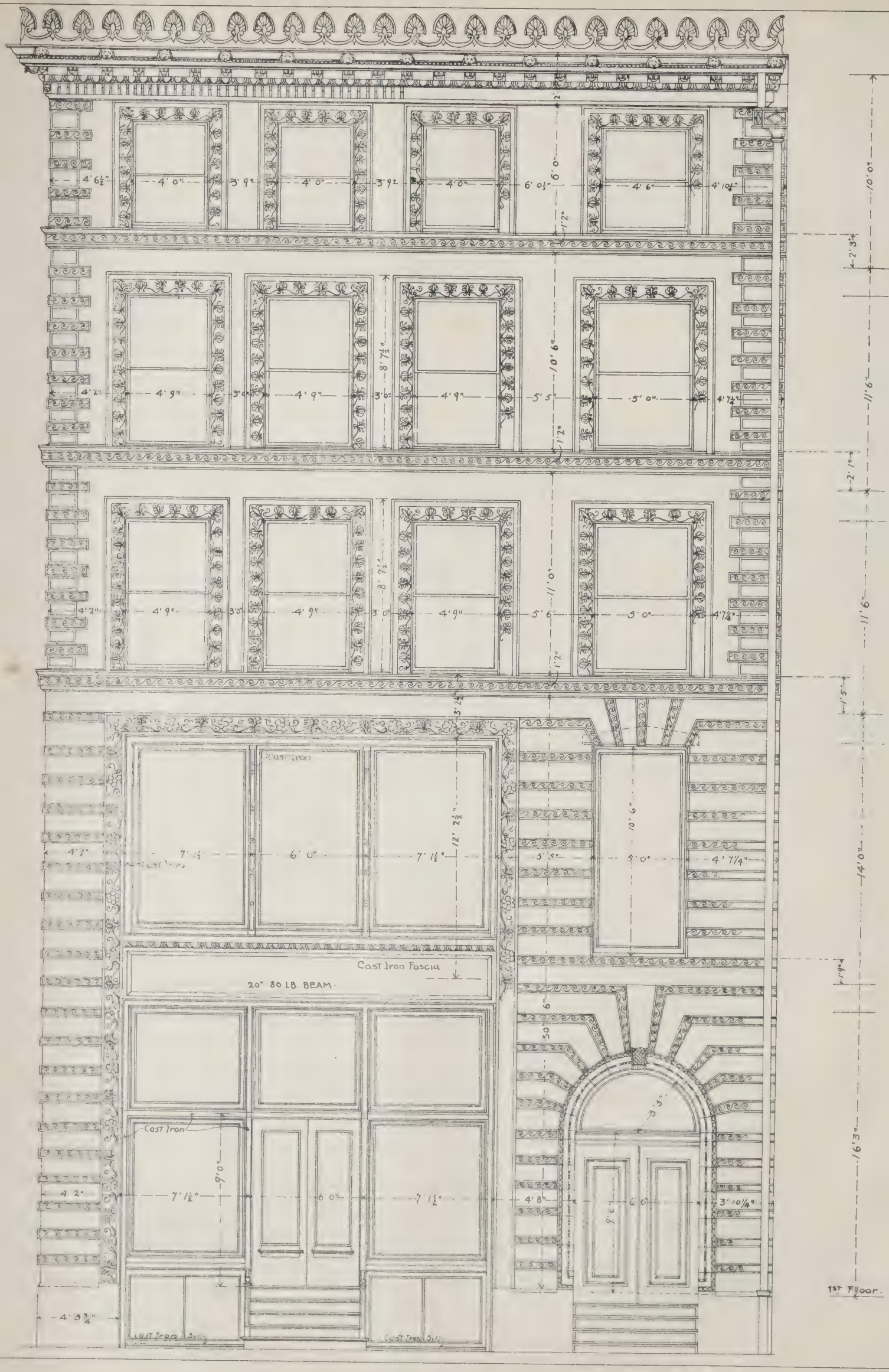
BUILDING FOR TRUSTEES OF THE DR. CULLIS ESTATE, BOSTON.

J. WILLIAMS BEAL, ARCHITECT, BOSTON.

Brick and Terra Cotta by the Boston Terra Cotta Co. See Pages 58 and 62.



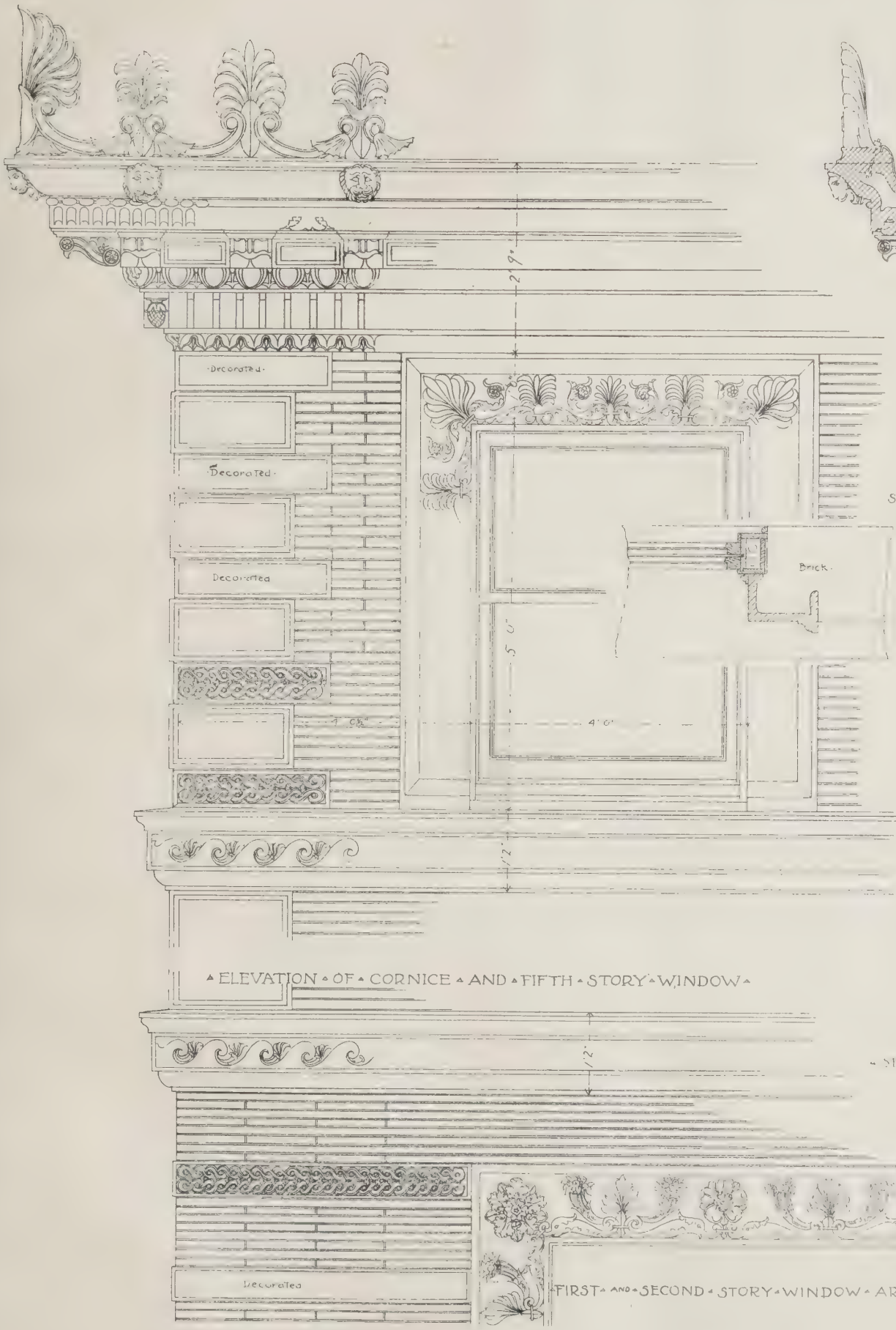
BUILDING FOR TRUSTEES OF THE DR. CULLIS ESTATE, BOSTON.
J. WILLIAMS BEAL, ARCHITECT, BOSTON.
BRICK AND TERRA COTTA BY THE BOSTON TERRA COTTA CO. SEE PAGES 58 AND 62.



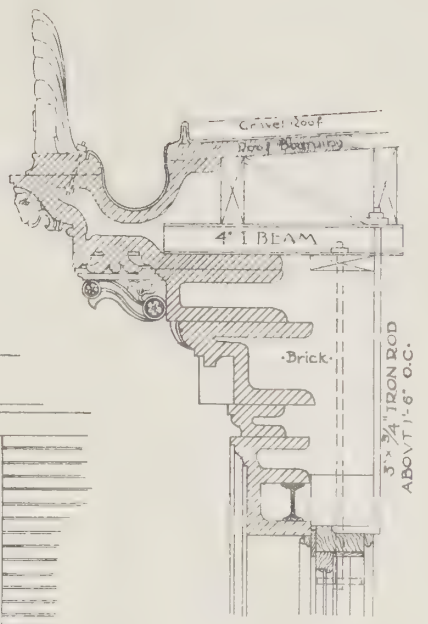
BUILDING FOR THE LUDLOW MFG. CO., ESSEX ST., BOSTON.

PEABODY & STEARNS, ARCHITECTS, BOSTON.

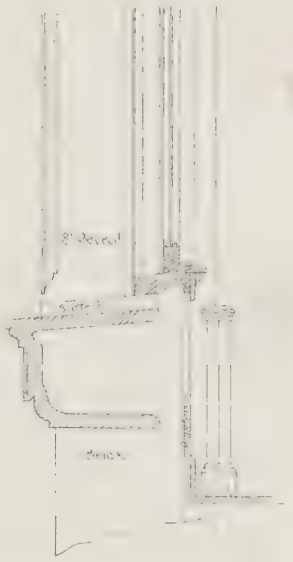
Brick by the Sayre & Fisher Co., New York; Terra Cotta by Waldo Bros., Boston Agents of the Perth Amboy Terra Cotta Co.



ELEVATION OF CORNICE AND FIFTH STORY WINDOW



SECTION THROUGH CORNICE



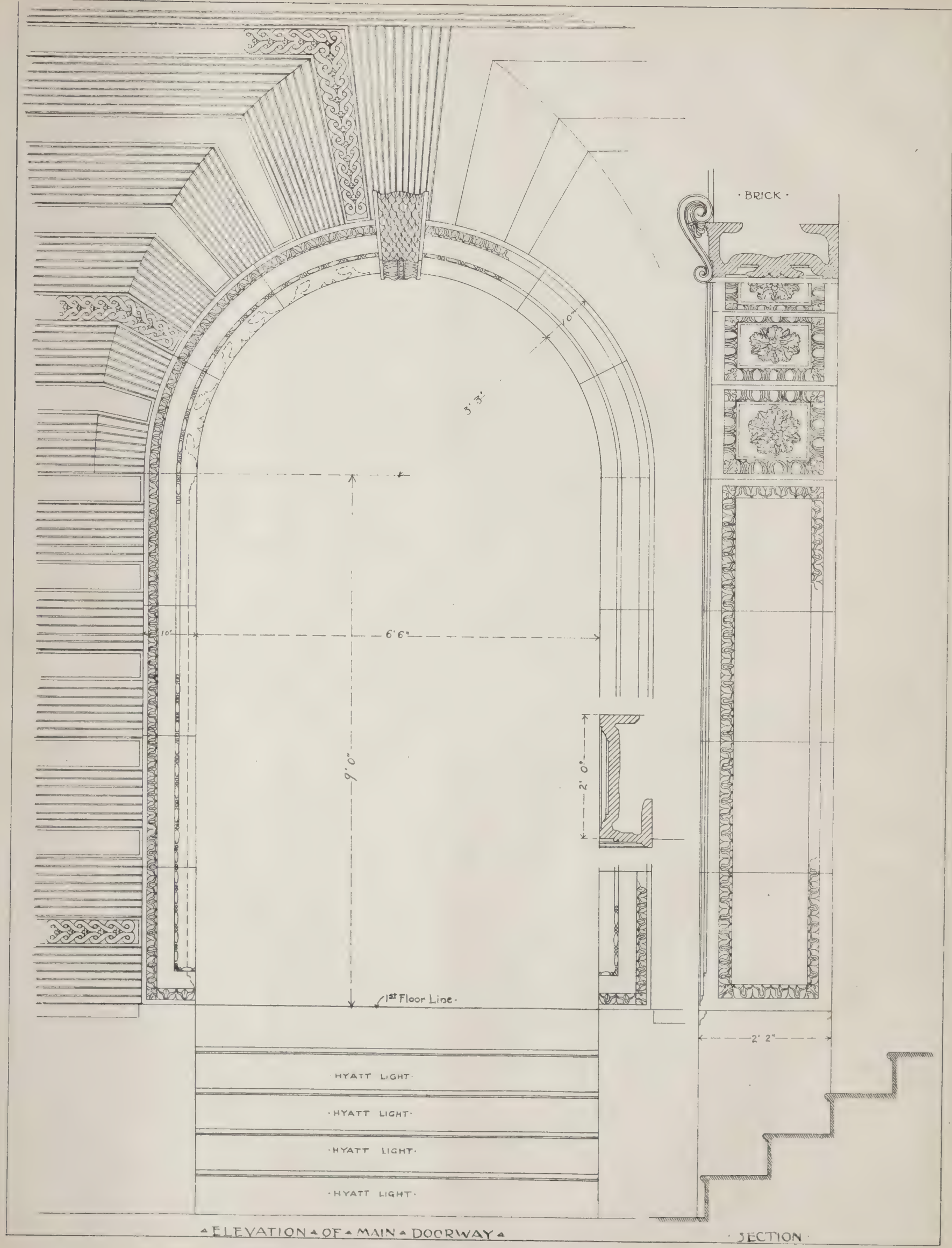
SECTION THROUGH THIRD STORY WINDOW

FIRST AND SECOND STORY WINDOW ARCHITRAVE

BUILDING FOR THE LUDLOW MFG. CO., ESSEX ST., BOSTON.

PEABODY & STEARNS, ARCHITECTS, BOSTON.

BRICK BY THE SAYRE & FISHER CO., NEW YORK; TERRA COTTA BY WALDO BROS., BOSTON AGENTS OF THE PERTH AMBOY TERRA COTTA CO.



BUILDING FOR THE LUDLOW MFG. CO., ESSEX ST., BOSTON.

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BRICK BY THE SAYRE & FISHER CO., NEW YORK; TERRA COTTA BY WALDO BROS., BOSTON AGENTS OF THE PERTH AMBOY TERRA COTTA CO.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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IN the *Engineering Magazine*, Mr. John Beverley Robinson, in an article entitled "Modern American Country Houses," suggests that slate could be used more than it is for covering the sides of houses as well as the roofs. He says: "There is a beautiful slate to be obtained which is regarded as waste by the quarries, *very much as until recently* the most beautiful brick were rejected by the kilns because they did not meet the demand for uniformity of color. These inferior qualities, as they are considered, I have reason to believe are of as good quality as many others for wear. After a year or two they change color irregularly, fade into soft blue-greens, olives, or browns, which make with the original green or purple a color effect which it is a joy to behold." We do not think that the large majority of brickmakers are as yet alive to the value of bricks they reject as imperfect, any more than the quarrymen are to the slates referred to. Some few manufacturers fully appreciate the artistic character of a brick wall where the bricks are not sorted to color, but even then they can hardly get over looking at an individual brick and comparing it with another rather than considering it with relation to its effect in the wall. One of the largest dealers in the country, speaking of an imported brick he was handling, said he did not dare to inspect a cargo when on the wharf for fear he could not resist having them sorted, so they went to the building as they came from the kiln. In the wall they are all right, the very imperfections, as he considered them, giving the building its attractive color effect. If a dealer accustomed to supplying bricks and terra-cotta for the finest buildings, by the best architects, cannot overcome this tendency to uniformity, what can be expected of manufacturers who seldom if ever come in contact with the architects, selling, as they do, almost wholly to jobbers or contractors? The bricks used in the building for the Cullis Estate, illustrated on plates 43, 44, and 45, of which special mention is made elsewhere, were doubtless a surprise to the salesman, and he possibly expected a terrible "kick" from the architect. The contractor of the job even proposed scouring down the front to bring it to an even color. It is doubtful how long the present beautiful coloring will remain, but we would advise the manufacturers to try and match it with a permanently colored brick. The Exchange Club on Batterymarch and Milk Streets, in this city, is another example of variety of color, obtained, not by using a variegated brick like the Pompeiian, but by using red bricks of different shades, inclining largely to very dark, dull reds. The trims are white terra-cotta, and the effect of the building, so far as we can judge by the start made on the second story, promises to be excellent. There is one great regret that we are constantly experiencing; that is, that processes of color printing are not available to place clearly before our readers the effects we refer to. Successful experiments have been made by a New York firm that hold out the promise of a solution to the problem that will be of commercial value. When this is reached we can promise something in the line of colored plates true to the subject.

HOW many who have noticed the peculiar construction of the corner of the Monadnock Building in Chicago know how it was done? It is in many respects one of the most skilful pieces of work on the part of both brickmaker and contractor to be found in this country. In the first place, the bricks are specially moulded, not only for the corner but also for the tops and bottoms of the bays and the second story. Starting from a square at the base, the corner gradually becomes rounded, the curve being that of a quarter of an ellipse, growing in size as it rises, the gradation being perfect. The architects (Messrs. Burnham & Root) gave the dimensions of the ellipse at various heights, and from these data the bricks were moulded, the well-known Anderson Company doing this part of the work. In the second story, the wall recedes with a slight curve from the line of the first story, and bricks were made for this curve, the beds being always horizontal. The George A. Fuller Company were the contractors and did the brickwork. All moulded and face brick were supplied by the Anderson Company. The bricks are all standard size, laid with one eighth or three thirty-seconds of an inch joints.

A SUBSCRIBER writes us that there are no decent bricks in Mexico. What they have are in size about 11 x 5 x 2½ to 3½ inches. It is impossible to get ten thousand of even size and thickness. Mexicans will not use the American size. In *ordinary* work, he says, all bricks are rubbed to an even size by hand. His letter concludes with the remark, "Cheerful country, isn't it?"

DESIGN FOR A MANTEL, BY THE JARDEN BRICK COMPANY.

EQUALITY OF LABOR.

Editor of The Brickbuilder, — It seems to me that a plain statement of a few facts pertaining to the working mechanics and laboring people of the present time would prove interesting to the readers of a journal like THE BRICKBUILDER.

The subject I have chosen is one of great interest to the working classes, and one which, when the discussion of it is once started, is likely to bring forth many opinions and conclusions from those most interested. The point I wish to impress upon the minds of my readers is that there is too much distinction between skilled labor and unskilled labor. Take, for example, the bricklayer, the hod-carrier, and the laborer who mixes the mortar.

In Omaha the bricklayers as a rule work eight hours per day and receive fifty cents per hour as pay. The laborers and hod-carriers get from twenty to twenty-five cents per hour. This, in my estimation, is entirely too much distinction between the skilled labor and the unskilled, for as such I will have to distinguish the two, although in ordinary work there is very little skill required on the part of the bricklayer. As a matter of fact, some kinds of artistic brickwork require some skill on the part of the bricklayer to execute with neatness and dispatch; yet the bricklayer does not possess the skill and ability that reasonably entitle him to be worth from twenty to thirty cents per hour more than his fellow-helper. The bricklayer handles the brick and lays them one at a time, and the physical labor required is as nothing when compared with that of the hod-carrier, whose customary load is from eighty to one hundred pounds, and this, too, is frequently carried up ladders, especially on two and three story buildings. Is it possible that people with common sense can look upon this state of affairs and call it justice to unskilled labor? Is it right that the man who performs that part of the physical labor that is the most exhausting to strength and vitality should receive only half pay for his labor? I claim it is not, yet it seems to be a fact the world over that those who do the least get the most. This is not only the case in the brickbuilding trade, but is universally true in every vocation of life. There are some reasons why skilled labor should receive better pay than unskilled, but there is no good, substantial reason why there should be maintained

such a great distinction as there is at present. I favor skilled labor, as being entitled to the best pay, yet I can see good and sufficient reasons why unskilled labor should receive its just reward and become more on a par with its class of the higher order. I do not mean to infer that the bricklayer's wages are too high, but I do mean to infer that the price of common labor is entirely too low. No mechanic will become rich very fast working by the day, even though he gets fifty cents an hour for his labor; for it must be remembered that mechanics in the building trades have long winters of enforced idleness, as well as many lost days between jobs, so that not more than seven or eight months in the year can be counted as giving steady employment. Only a few favored ones have work nearly all the time. The masses are idle nearly all the time during the winter season and have to live upon what they were able to save through the working season. But this is not all: at the beginning of spring work nine out of ten of the laboring class find themselves largely in debt for the actual necessaries of life which they had to have through winter, and that it will take them half or two thirds the season at steady work and good wages to get even with the world. Thus, when winter comes again, it finds them with a scanty allowance; spring comes and finds them no better off than they were the year before; and if work has been scarce, or if they have had sickness in the family, then they are even worse off.

That labor is insufficiently paid no one can hardly deny, and that the wages for unskilled workmen are entirely inadequate to the support of themselves and families no one with practical common sense can fail to see and admit.

For example, I will contrast the difference between skilled and unskilled labor, taking the wages of the bricklayer and his helper for the basis of my estimates. I will allow seven and one half months in a year for labor, which is about the best that can be counted on. Allowing twenty-six working days to a month, eight hours a day and fifty cents per hour, the net earnings of the bricklayer are $780.00. What are his expenses, figured economically? Suppose he is a married man, not with a large family, like most of the working class, but a family of only four. It will cost him $1.50 each, $6.00 per week, or per year, for an economical living, $312.00; coal and lights per year, $50.00; clothing, only $15.00 each per year, $60.00; house rent, $10.00 per month, $120.00; incidental expenses, $25.00; total amount of expenses, $567.00. Net earnings, $780.00; expenses, $567.00. Amount over and above expenses, $213.00. Thus the bricklayer has the bare possibility of being able to save about $200 per year, basing his expenses very low; and it is plainly seen that sickness and a little bad luck here and there, the furnishing of household necessities that have to be purchased every few years at least, will not leave very much surplus money on his hands at the end of the year. How fares it with the hod-carrier, the man of bone and muscle who does the most work for the least pay? Seven and one half months per year, twenty-six days per month, eight hours per day at twenty-five cents per hour, and his net earnings amount to $390.00. Now figure his expenses. There is no sensible reason in the world why this man and his family should not be entitled to live just as good, wear just as good clothes, live in just as comfortable a house, and in every respect live equal to his skilled and superior workman; but he cannot do it; his wages will not admit of it, so his expenses must be cut down to the lowest notch. Allowing four persons to the family, $1.00 each, $4.00 per week, or per year for a scanty living $208.00; coal and lights per year, $40.00; clothing, only $10.00 each per year, $40.00; house rent, $8.00 per month, $96.00; incidental expenses, $6.00; total amount of expenses, $390.00. Net earnings, $390.00; expenses, $390.00.

Thus the man doing the hardest work has to stint himself and live on next to nothing in order to make a bare living, and in reality the man doing the hardest labor needs the best living and care to keep up his strength and vitality. It is just like working a horse; if you work him hard you must feed him accordingly, or he will grow poor and soon be of no account. Now, it has been shown that a bricklayer at fifty cents per hour makes but little more than a comfortable living. Every working-man should be entitled to a respectable living, and if a bricklayer requires fifty cents per hour to secure a comfortable living, his helper, who is entitled to live equally as well, should have at least forty cents per hour for his labor. Equal pay for equal work should be considered in the matter of wages vastly more than it is; and, as the cost of supporting a common laborer's family in a respectable way of living is the same as it is for the family of the man of skill, he is entitled to about the same pay. What he lacks in skill he makes up in physical labor, and is therefore entitled to equal pay for equal work.

I. P. Hicks.

Omaha, Neb.

PRINTING FOR THE TRADE.

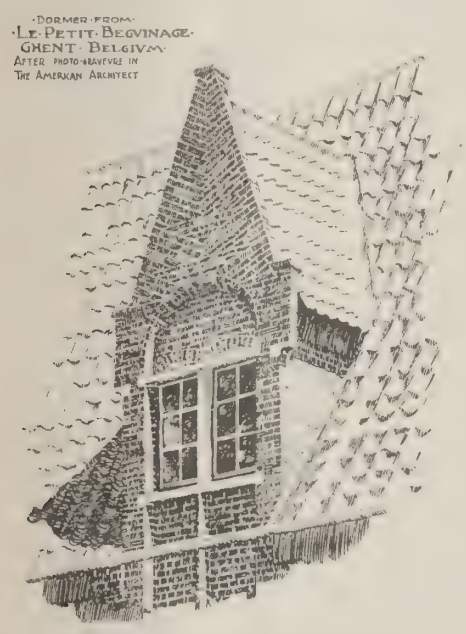
THE publishers of The Brickbuilder are now prepared to supply composition, electrotyping, press work, designing, and engraving, and any work in connection with cataloguing, at moderate prices, considering the quality of the work. Manufacturers of clay-working machinery will find it to their advantage to get a quotation from us on catalogue and circular work. Particular attention will be given to out-of-town orders for business cards, stationery, etc., from architects and builders. The character of our paper forces us to have every facility for designing, drawing, and engraving, and illustrations of every character can be executed promptly and at moderate prices. Correspondence is solicited.

BRICK CORNICES.

THE number of The Brickbuilder for July, 1892, contains forty-five designs for brick cornices. Many of these are for common brick, and every manufacturer of brick and every dealer in mason builders' supplies should have a copy in his office. It costs only twenty-five cents, and will pay for itself a hundred times over.

THE ILLUSTRATIONS.

PLATE 41. Rhode Island School of Design, Providence, R. I. (main elevation); Andrews, Jaques & Rantoul, architects, Boston, Mass. This building is built of common brick, in Flemish bond above the first story. The spandrels of first-story arches are filled with an all-over pattern of hexagonal panels of four inches reveal, the dividing lines being projecting headers. It is intended to ultimately fill these panels with modelled ornament, executed in clay by the students, and fired. A suggestion of this treatment is shown in the spandrel at the left-hand end. The rendering of the drawing was adopted to give the general effect of wall surface and openings. The plate is exactly one eighth inch scale.



DRAWN FOR COMPETITION No. 9
by WILL S. ALDRICH, Somerville, Mass.
A good drawing generally but a hard treatment of the window itself.

D. A. GREGG.

PLATE 42. Rhode Island School of Design, Providence, R. I. (details); Andrews, Jaques & Rantoul, architects, Boston.

PLATES 43, 44 and 45. Building for trustees of the Dr. Cullis estate, Huntington Avenue, Boston; J. Williams Beal, architect, Boston. (See photograph on page 58.) This charming little façade is at present one of the finest examples of color in brickwork in this city. It is of light stone in the first story, with light brick and white terra-cotta above. Both brick and terra-cotta came from the Boston Terra-cotta Works (Fiske, Homes & Co., managers). The brick is colored beautifully in delicate greens and yellows that are largely accidental, for the manufacturers will not agree to duplicate the job. There is some very good interior detail that we would suggest to some publication within whose field such work lies.

PLATES 46, 47, and 48. Building for the Ludlow Manufacturing Company, Essex Street, Boston; Peabody & Stearns, architects, Boston. (Elevation on Essex Street and details.) This building is in course of erection to replace the one destroyed in the fire of March 10 of this year. Subscribers will remember the elevation and details of the former building, published in our initial number, and the photograph, published in the number for February of this year. The new building is of light cream-colored terra-cotta by the Perth-Amboy Terra-cotta Company, and a brick to match by the Sayre & Fisher Company of New York.

TRADE NOTES.

ON page 60 we publish a design prepared by the Jarden Brick Company of Philadelphia, to show the use of their ornamental bricks in mantel design. To give some idea of the cost of such a mantel, they have prepared a schedule of the stock, including the fireplace lining, the hearth, and the tile-work which shows below the shelf. In red brick, the material, properly packed for shipment and delivered on the cars at Philadelphia, will cost $180. In buff brick the cost is $225, and in "iron spot mottled," $260. This mantel is sixteen feet high and ten feet wide. The fireplace opening is six feet. The company has many smaller and simpler designs for mantels that are very effective, and for such interior work the mechanical perfection of the Jarden brick renders it particularly suitable.

IT is one thing to get up a fine line of ornamental brick, but it is fully as difficult to keep stock to supply the demand. Ever since the Philadelphia & Boston Face Brick Company sprung their line of Renaissance patterns on the architectural profession, the problem that has confronted them has been the one of increasing the capacity of their works fast enough to keep up with their orders. Had they not first accumulated a large stock of all shapes, before entering the market, they would have been in bad shape to meet the orders that have come in from all parts of the country.

THOSE of our readers interested in sliding blinds, who attend the World's Columbian Exposition, should not miss inspecting the very complete exhibit of the Willer Manufacturing Company of Milwaukee, in the north end of the balcony in the Liberal Arts Building. A similar exhibit may also be seen at their regular Chicago office in the Adams Express Building, 185 Dearborn Street. Their line of blinds of every description, screens, and screen doors is well worth inspection.

FOR convenience and neatness the sample case of mortar colors prepared by S. Bowen's Sons of Philadelphia, for architects' use in selecting tints of the Pecora Mortar Colors, is one of the best things yet issued by the trade.

AS OTHERS SEE US.

Geo. W. Spaulding, Architect, Woonsocket, R. I.: "I cannot get along very well without THE BRICKBUILDER. Please send me the back numbers and oblige."

W. W. Thompson, Architect, Dallas, Tex.: "I have felt a deep interest in your paper since its beginning, as it covers an entirely different field from any other architectural paper I know of; and I must say that it is covering the field very well indeed. Would be glad to see something in it from the South."

THE BRICKBUILDER

VOL. II. BOSTON, JULY, 1893. NO. 7.

BRICKWORK AND FAIENCE AT THE FAIR.

GEORGE M. R. TWOSE, Chicago.

THE main buildings of the Fair, in their majesty and beauty, are more apt to dazzle the eyes of the seeker after brickwork with the white halo that emanates from them, than to give him assistance by rendering the few monuments reared with the products of the potter's art more prominent by their position within the influence of this white glory.

Yet to whomsoever seeks comes the knowledge that those rectangular prisms of clay play a most important, although retiring, part among the materials composing this ephemeral city; for, to select from their many uses, they are silently guarding, behind a mask of staff, the treasures of the art palace from the ruin the unopposed elements would quickly inflict, supporting without a quiver, through the massive strength of their combined hundreds of thousands, the powerful throbs of the mighty Allis engine, and, at the other end of their range, forming, under the judiciously disposing hand of the architect, buildings of great quaintness and interest.

These are but a few examples to cheer those interested with fresh conviction of the vast area of use that exists for brickwork, while over on the lake front of the exposition there is a most humorous and novel substitution of bricks for the materials used heretofore, which would seem to open the limitless plains of the sea to the evangelizing energy of THE BRICKBUILDER. This best thing in new departures that the World's Fair has to offer is the battleship *Illinois*, which is a fine piece of architecture, scarcely needing the distinguishing adjective "naval" usually prefixed in classifying structures of this sort; for, though it is not so widely appreciated as it should be, this white and stately vessel, lying with equal calmness on the storm-agitated or the breeze-rippled surface of Lake Michigan, is constructed entirely of brickwork beneath its armor plating of staff. It is presumably to this fact that its steadiness and the consequent jauntiness of the crowds that tread its decks are due. A similar steadiness in any of the Atlantic liners would insure a fortune-giving popularity, which would seem to make this new idea well worth developing, *pro bono publico* and incidentally of the brick trade.

To turn from the problematical to the better demonstrated uses of brickwork, we find, close to the northeast end of the Liberal Arts Building, a representation of a Dutch cocoa house erected by Messrs. Van Houten & Zoon of Holland, for the purpose of displaying their wares, which they do in the most charming manner, the main part of the house being occupied by five delightfully designed rooms of varying Dutch character, furnished with tables and seats whereat they who wish it are served with the firm's cocoa, the consumption of which gives a grateful period of rest, rendered still more pleasant by the view of the lake just across the road.

Although the actual construction of the building is only lath and plaster painted to imitate brickwork, it is so faithfully done that the deception passes almost unnoticed by the general spectator, and, if observed, its location in that park of illusive appearances shields it from the scorn it might evoke amid other surroundings. The design is modelled on the style current in Holland in the seventeenth century, which period is also reflected in the interior of the room on the left-hand side of the east entrance, the door of which bears the date 1634; while on the walls is a dado of Dutch tiles of the same age taken from an old house in Holland. This tile dado is one of the most charming features of the place and is a beautiful example of the application of this form of clay to interior decoration. The effect of the blue-and-white tone is very pleasing, being evenly distributed by the repetition of the tiles, and the similar arrangement of the designs, which are all most childlike conceptions and representations of biblical scenes and incidents. The exterior material is brick and terra-cotta, and the whole effect is one of life and character.

Seen from the east, Messrs. Van Houten & Zoon's house suffers greatly from its juxtaposition to the huge masses of the Liberal Arts Building, which imposes upon it the effect of being something done in miniature, or

EXHIBIT OF C. J. VAN HOUTEN & ZOON, COCOA MANUFACTURERS, WORLD'S COLUMBIAN EXPOSITION.

a scale reduction, so small does the adjacent pile make it appear.

This wears off on investigation, and the mind is completely reassured on finding, by measurement, that the bricks are of normal size, though curiously enough laid in English bond instead of Flemish, as one would expect. The west and east fronts, which are similar, are a trifle wanting in quietness and mass on account of the lack of wall space occasioned by the demand for many and large windows in the public rooms. The window openings themselves are very well treated, and are remarkable for the strength of the effect that has been produced with only a four-inch reveal emphasized by a flat Ogee mould round the entire opening; while the arrangement of sash and tympana is a very successful solution of the difficulty attending the association of the domestic window frame with a curved or pointed arch, and is well worthy of adoption by designers in brickwork.

EXHIBIT OF THE NORTHWESTERN TERRA-COTTA COMPANY.

The coloring is a trifle unfortunate, appearing a little too dark, though this, being probably due to the effect on the eye of the white buildings, might not be considered so among other surroundings; and as a whole the building is interesting and pleasant to gaze upon, full of a variety that never descends to fussiness, well grouped, and evincing, in its general impress of great good taste, that it is the work of a scholarly and refined mind. The entire structure was prepared in Holland, and it is interesting to note the thoroughness of the visible construction, as shown by the frequent and heavy wrought-iron anchors and the terra-cotta and stone blocks which tie back all projecting planes to the main hall.

The entire cost was $65,000 (inclusive of the elaborate interior fittings and furniture), and the building, which is now in bond, will be probably returned to Antwerp, "leaving not a wrack behind," except in the minds of the people (10,000 a day) who are equally refreshed by its cocoa and its atmosphere of quaintness and of easy moving existence. M. Guillaume Wymen of Antwerp, the architect, is to be highly congratulated on his interesting and nationally characteristic edifice.

The general display of art tiles in the exhibition is very inclusive, and presents many points of interest, from the porcelain of the Royal Berlin factory, the blue beauty of the Delft ware, and the interesting English exhibit, down to but not including some detestable slabs which are designed and marked to imitate mosiac *tesseræ*. Tile flooring has sufficient capability for beauty of its own to make such borrowing of false appearances a quite unnecessary and regretable thing. The English exhibit especially indicates to what a great degree faience has usurped the place of all previously used materials, in that country, for the interior decoration of clubs, hotels, restaurants, and other buildings of like public character, while even on the steamboats of the Atlantic and Orient lines it is being extensively used; its use, primarily confined to bath and toilet rooms, now being extended to smoking-rooms and other portions of the boats. The principal reason for this is, of course, the ease and quickness with which it may be cleaned, wherein lies its great advantage over other materials, as is conclusively shown in the big London clubs; for, while in the days of paint and paper redecoration was an annual necessity, and period of horror, during which the club was uninhabitable and its members obliged to seek the hospitality of other similar institutions, the ease and quickness with which walls, ceilings, and floors are now restored to their pristine freshness provide a condition of greater general cleanliness and render unnecessary the invasion of the painter and paper-hanger; and the club consequently is not obliged to impose upon its members the necessity of going elsewhere during certain periods.

In hotels also, of course, this quality is greatly appre-

ciated, and with such beauty and such virtues the material has achieved the greatest popularity across the water. The general conditions which make it thus widely used abroad are the same as those which rule in America; and although marble is a new factor, yet with activity on the part of the tile manufacturers and the improvements that would ensue therefrom, developments may be looked for in this country similar to those which have occurred on the other side of the Atlantic. These individual exhibits will be treated at greater length in future papers, but meanwhile visitors may feel assured that this particular branch of the Liberal Arts is well worth a visit.

On the shores of the south basin, in the French colonies group, the Tonkin palace has many interesting articles of the same description. These clever people, with whom the art is a very old one, use it for a great variety of purposes, the palace in question having a most magnificent ridge and roof of colored faience. Inside are seats and stools of the same material, while a curious parallel to the perforated stone tracery, found early in the history of windows prior to the general use of glass, is to be seen in the tiles of open design which are used for the same purpose.

The exhibit of the Northwestern Terra-Cotta Works, of Chicago, Ill., is to be found in the northwest corner of the Liberal Arts, and is a splendid example of the astonishing pitch of perfection to which this manufacture has been wrought. The main object is a pavilion designed especially for the exposition by Mr. Arthur Heun, and the sharpness and delicacy of the execution of the ornament and mouldings are things to see and admire. The main outline of the structure is Gothic, of a transitional period which allows of the legitimate introduction of both Gothic and Renaissance detail; both are admirable in design and in execution, and the variety of the surface treatment inside and out makes an ensemble which claims a long and pleasant period of examination. The building, which is admirably adapted for the exhibition of all kinds of ornament, and is also charming taken as a whole, should do much to popularize and spread the use of terra-cotta as an architectural feature, in showing, as it does, the capabilities of the material and its great quality of receiving and recording even the lightest artistic impress. In the richness of these few acres there is much to mark and learn; and from the beauty of it all may greater beauty rise!

TERRA-COTTA AND FAIENCE AS MATERIALS FOR ARCHITECTURAL AND DECORATIVE APPLICATION.

(*Continued from June number.*)

On the general question of the application of terra-cotta, may I now be permitted to make a few practical remarks? I noticed that your esteemed president, in his opening address, alluded to the objections to the use of terra-cotta, caused by its liability to shrinkage, and to the twisting, etc., of lines that should be rigid, caused in this way, and there can be no doubt that in these remarks he has spoken from extensive practical experience, and yet I venture to say that, if he would add yet further to his experience, taking due precaution in the matter, he would require no other arguments to convince him that

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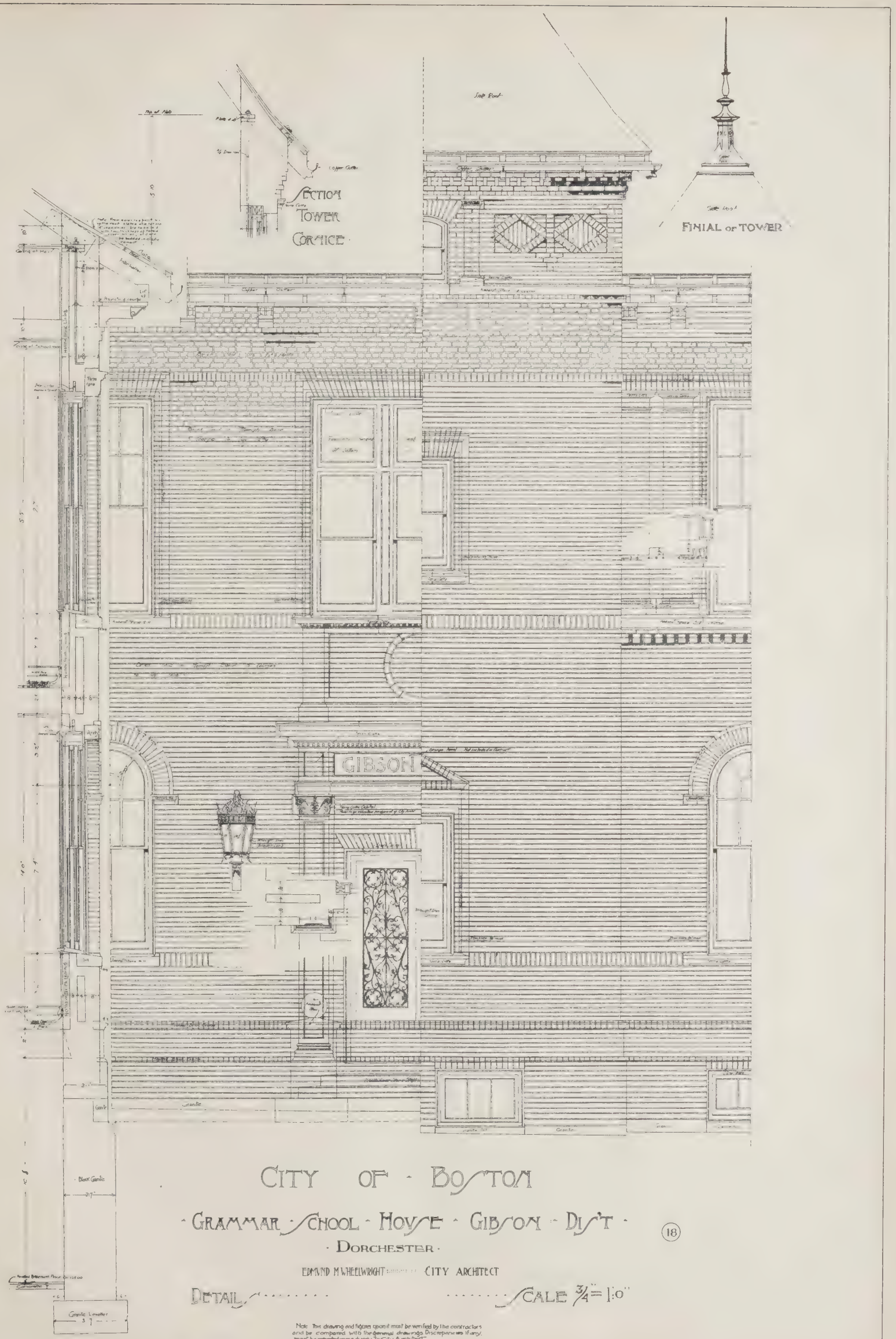
LEGION OF HONOR BUILDING, HUNTINGTON AVENUE, BOSTON.

ROTCH & TILDEN, ARCHITECTS, BOSTON.

Terra-cotta by the Perth Amboy Terra-Cotta Company (Waldo Bros., Agents).



CITY OF BOSTON

GRAMMAR SCHOOL HOUSE GIBSON DIST

(18)

DORCHESTER

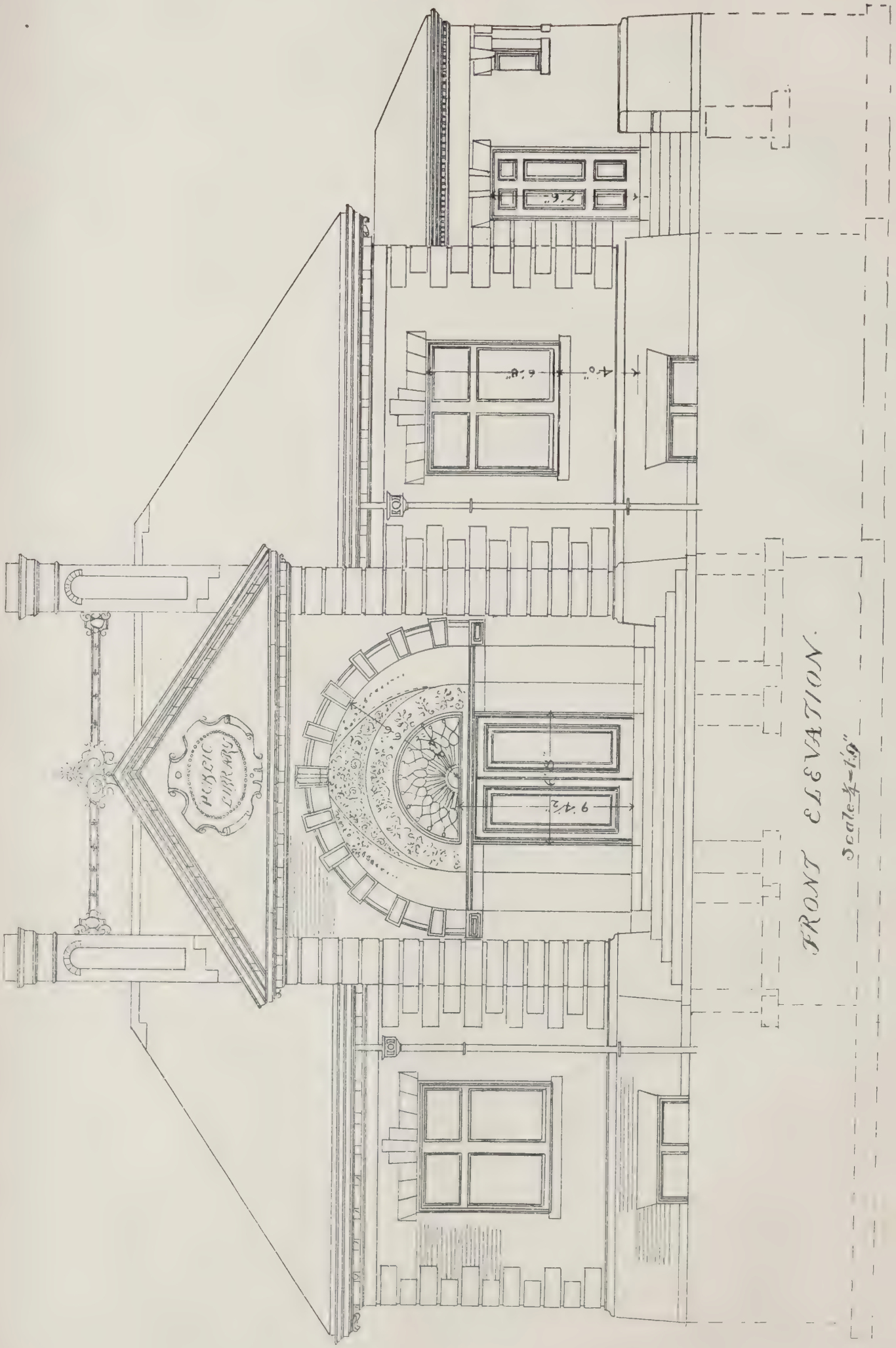
EDMUND M. WHEELWRIGHT ..... CITY ARCHITECT

DETAIL ..... SCALE 3/4" = 1:0"

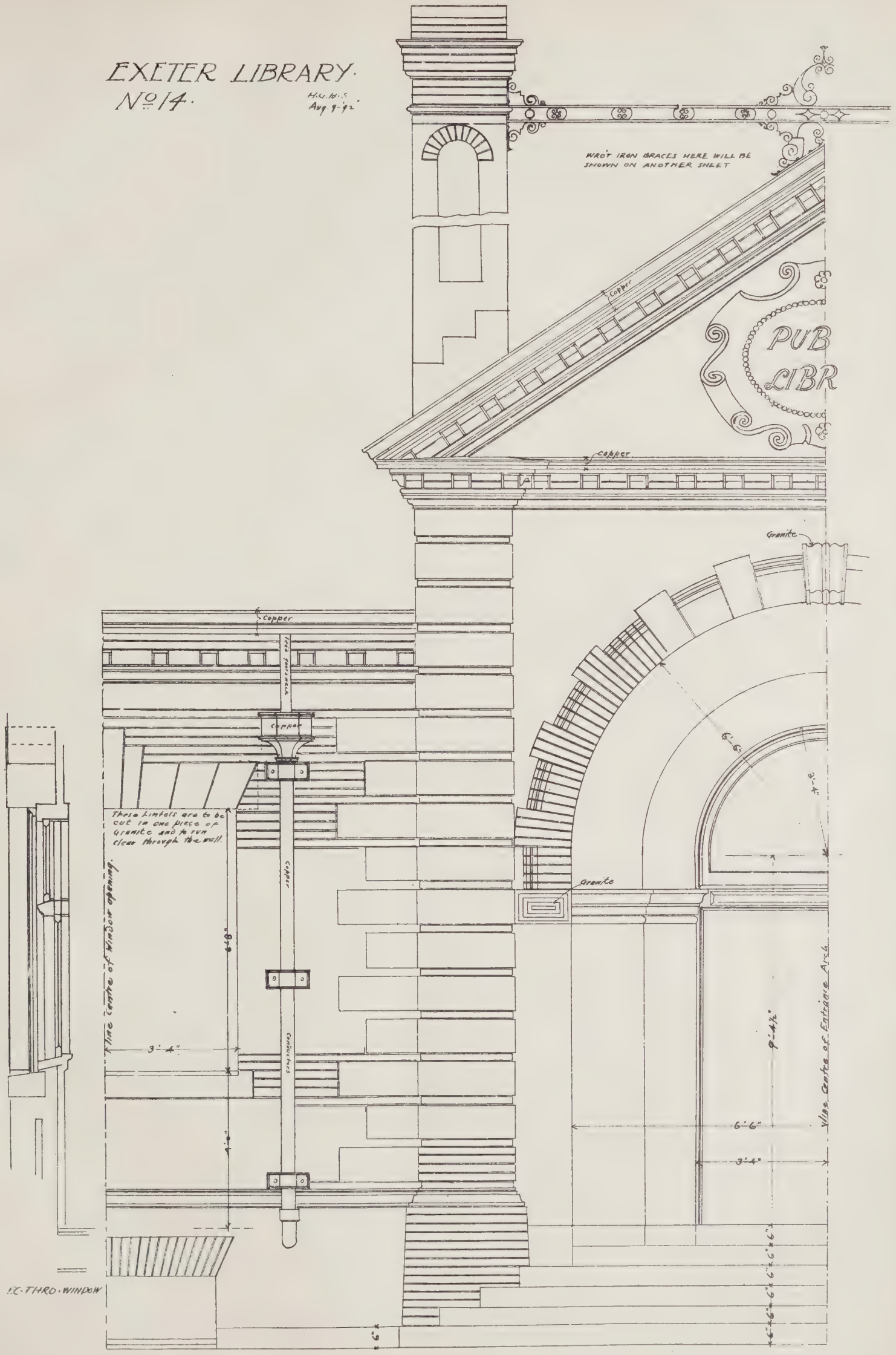
Note. This drawing and figures upon it must be verified by the contractors and be compared with the Grammar drawings. Discrepancies if any, must be reported immediately to City Architect.

DETAILS OF GRAMMAR SCHOOL HOUSE, GIBSON DISTRICT, BOSTON.

EDMUND M. WHEELWRIGHT, CITY ARCHITECT.



FRONT ELEVATION, EXETER PUBLIC LIBRARY.
MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON.



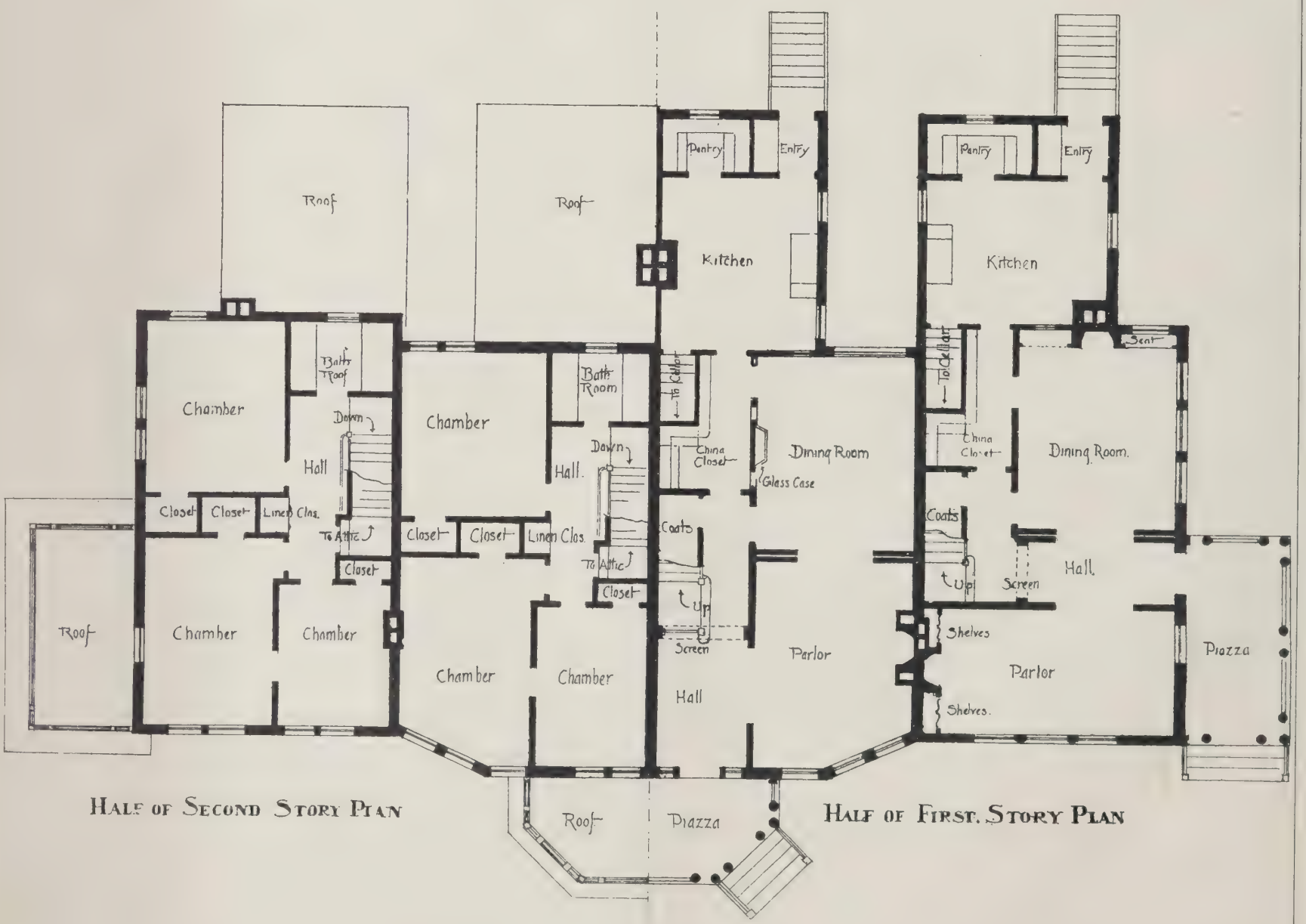
EXETER PUBLIC LIBRARY: DETAIL.

MESSRS. ROTCH & TILDEN, ARCHITECTS.

FRONT ELEVATION, HOUSES FOR DR. H. E. MARION, BRIGHTON, MASS.

L. O. WARREN, ARCHITECT, BOSTON.

SIDE ELEVATION



HALF OF SECOND STORY PLAN

HALF OF FIRST STORY PLAN

SIDE ELEVATION AND PLANS, HOUSES FOR DR. H. E. MARION, BRIGHTON.

L. O. WARREN, ARCHITECT, BOSTON.

--- Proposed ---
--- New High School Building ---
- at ---
-- Quincy, Mass. ---
-- Kendall & Stevens, Archts. ---
--- Boston, Mass. ---

DESIGN FOR SCHOOL HOUSE, QUINCY, MASS.

MESSRS. KENDALL & STEVENS, ARCHITECTS, BOSTON.

HOUSE · FOR · J · C · MELVIN · ESQ · · WEST · NEWTON · MASS · VIEW · FROM THE · SOUTH · EAST ·

· CHAPMAN · & · FRAZER · ARCHITECTS · 89 · STATE · ST · BOSTON ·

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PORTION OF FRIEZE, HARTFORD, CONN., SAVINGS BANK.

PEABODY & STEARNS, ARCHITECTS, BOSTON.

Executed by the Perth Amboy Terra-Cotta Company.

the qualities he ascribes to terra-cotta do not necessarily pertain to the material, and are characteristic only of a bad form of it. No doubt there are, unfortunately, notable instances of bad terra-cotta, as there are of bad materials of almost any description; but there are also some instances exactly the reverse. This much can be said for terra-cotta: that every year increases the knowledge, skill and appliances brought to bear in its production, and as trained and skilled workmanship is brought to bear with improved processes, the quality of the work must improve in the respect in which I am bound to say it has been, and is still, sometimes very deficient. As a material, it has too often been resorted to by architects for its supposed cheapness, and too often it has not been the best make by the best makers, but the cheapest make by the lowest-priced maker, that has been adopted. By this standard, terra-cotta work has been judged and found guilty, whereas there is no material in which there is greater margin for skill and superiority of treatment or for inefficiency and failure. I hesitate to say what I have known of the miserable shifts by which terra-cotta is sometimes turned out to meet the demand of the lowest possible price as the alternative of the greatest possible excellence, and there is little wonder that such terra-cotta is unsatisfactory.

Another objection to the use of terra-cotta, and one in which I feel there has been and is still some force, is that it is slow of production. There is no doubt that it does take more time than some forms of material for its satisfactory production, and there is no doubt also that its extensive use in a structure has sometimes caused a somewhat slower erection than has been desirable either in the interests of the builder or the owner. There is no doubt also that in such an event the terra-cotta manufacturer gets the full benefit of any irritation caused by the delay, nor will I say he is always wholly innocent, but the remedy for such a condition of things is often very obvious. It is often traceable to the supply being intrusted to a producer with an insufficient plant, and at a price that will never enable him to pay for any addition to it. He is no doubt to blame for taking more work than he can execute, but perhaps he is slack at the time and sanguine, and does his best, but if he is not in a position to start fair with his work at the first, woe be to him if he has a heavy job on hand.

The only satisfactory method in terra-cotta work is to anticipate, as far as possible, the progress of the structure, and this can only be done in the first instance by the architect making the terra-cotta the subject of special estimate as far as practicable ahead of the general work. This is now indeed almost the general rule, and it has many advantages. It brings the architect into direct con-

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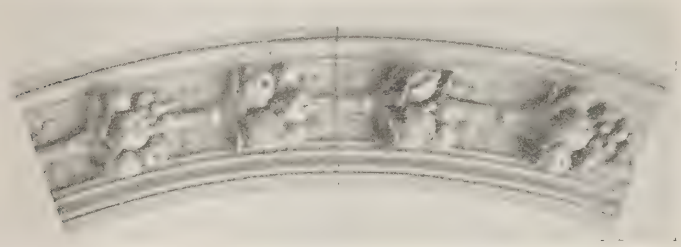
tact with the producers, and they are in a better position to understand and follow his special requirements. The margin for variation in the general estimate is reduced, and the builder at once knows the amount he has to include for items, which are often a source of perplexity, and with respect to which there is sometimes such wide differences of price as possibly to prejudice one way or the other the general estimate.



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The delay in getting out working drawings is also not infrequently a source of hindrance, and if an architect has failed to realize the necessity of being well ahead with them, it is much less easy for a terra-cotta producer to arrange and set out his work in which, more than in any other material, it is of importance to see the way through from beginning to end, as far as possible from the first step.

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DETAIL FROM POPE BUILDING, BOSTON. PEABODY & STEARNS, ARCHITECTS.
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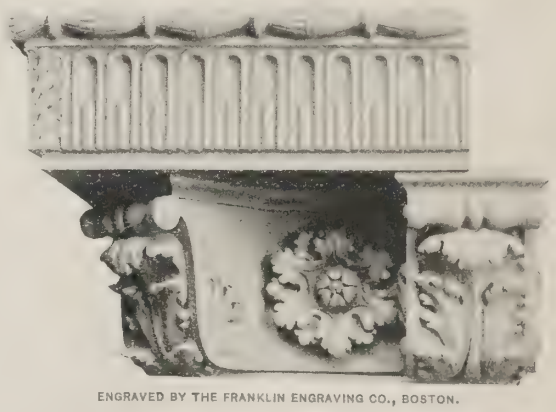
It has also happened that difficulties have arisen in carrying out working designs. Comparatively few architects or draughtsmen have had very extensive experience in working out terra-cotta drawings; and although, of course, principles of construction apply in all cases, yet terra-cotta cannot be treated altogether as stone. The form and size of blocks, the bond, the key of the joints, mouldings, etc., require some special consideration if the work is to be carried out to the best advantage. It is not an unknown thing for a producer to struggle with a badly conceived working drawing, and so cause serious delay and inconvenience, instead of at once pointing out the practical difficulties, and suggesting an efficient remedy, which might be adopted without prejudice to the constructional lines of the design; yet I venture to believe there are few architects who would not at once recognize and adopt any really intelligent suggestion thus offered, when clear from any ulterior object. Nor will I say that the terra-cotta producer has always succeeded in getting the best talent necessary for his work: it is a work to which comparatively few men have been actually trained. For its successful management many good qualities are essential, and to carry out any important work in terra-cotta, there must be constructive skill sufficient correctly to read, and correct if need be, in relation to other parts, any working drawing. In not a few cases it is the doubtful privilege of the terra-cotta manufacturer to make the working drawings. For this are required the thorough practical training of a mason and the constructive skill of a draughtsman. There must be a practical knowledge of the material, and the best mode of treatment; sound judgment as to what can and cannot be successfully done; perception sufficiently acute to take in the idea of the architect, or any novel point of treatment; artistic taste enough to insure thoroughly good modelling of all enriched or decorative parts; and sufficient science and practical skill to secure the most perfect system of burning adapted to particular material used. It is not surprising that a producer should sometimes break down on some of these points, in the absence of men specially and technically trained. I am, however, glad to believe that this is a point in which considerable progress is now being made, and, should the use of terra-cotta become still more general, it will be far more easy for producers to meet enlarged demands than it has been in the past, when, unfortunately for themselves, and sometimes for their clients, their attempts to meet extraordinary demands have, in not a few instances, resulted in spasmodic effort and corresponding disappointment. — *The Building News.*

(Concluded.)



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CORRESPONDENTS WANTED.

A correspondent for THE BRICKBUILDER is wanted in every city and town in the United States to keep us posted on everything of interest to our readers. For full information as to what will be required and the remuneration address the editor, P. O. Box 3282, Boston.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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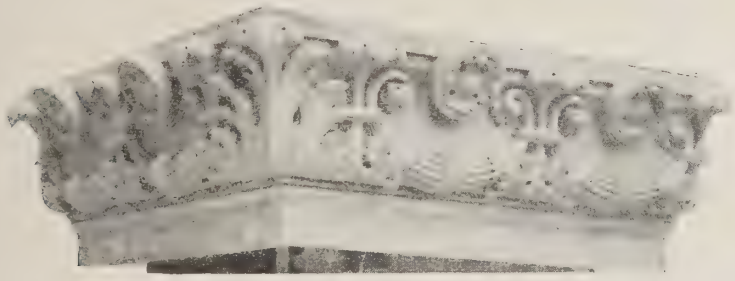

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DETAIL FROM POPE BUILDING, BOSTON.

PEABODY & STEARNS, ARCHITECTS. Executed by the Perth Amboy Terra-Cotta Company (Waldo Bros., New England Agents).

WE have frequently had trouble in convincing brickmakers that we were advancing their interests by a general advocacy of the use of bricks. In an article in an early issue we pointed out ways in which they could help their own business by securing its circulation among the architects and builders of their locality, and we mentioned one thing in particular, — the substitution of brick for cornices where sheet metal or wood are more often used. We called attention to the fact that our publication of designs and details would suggest treatments in brick which would secure its use in place of other materials and, consequently, increase its sale. We refer to this here as we have just received a letter from Mr. L. L. Rand, an architect of Spokane, Wash., in which he says: "Your paper is one of the most valuable that comes to my office, and I have no comments to make, only of a favorable kind. We use a great deal of brick here, as our building stones are granites and hard to work. So far as the work of my own office is concerned, *I can see the effects of your paper by the increased use of brick for trimmings and ornament where stone was formerly used,* with the result that the buildings are looking better, cleaner, and more satisfactory in every respect. We have bricks that ring like steel, and our manufactures of clay are very creditable."

If any evidence more directly in support of our argument could be produced, we do not know what it could be. This is only one instance. Why is it not quite as likely that THE BRICKBUILDER is exercising a similar influence in the office of every one of its subscribers, and increasing the sales of brick everywhere? There is not a brickmaker in the United States that could not get back in actual cash ten times the yearly subscription price, every month of the building season, by intelligently using the copies as they appear. There are a dozen ways in which this can be done, but the best way is to subscribe for a copy to be sent to each one of your customers among local builders. Special inducements will be made to brickmakers wishing to make a trial.

AMERICAN AND FOREIGN BRICKWORK.

THE exhibits of brickwork as compared with those of the French Exposition of 1889, says the *Builders' Gazette*, are favorable to the American product so far as the brick are concerned. The arrangement of the brick and clay products in the Paris Exposition was generally more artistic as to design and color than is the case at Chicago, but as to the quality of the brick themselves, their general character and color, independent of arrangement in the structure, there can be no question. This information comes to us from one who is posted on the subject. There can be not the least question that the best brick made in the world to-day is an American product. There may be some exceptions to this in the way of specialties.

England has given more attention to the manufacture of enamelled brick than have we; and it is generally understood that in this particular they have been more successful, though there is nothing to be ashamed of in what has been done. It may be, and probably is, true that enamelled brick of a quality quite as good as those made any place is now being produced in this country.

However, this has not been done long enough, nor is the result so fully established that we can as yet claim to have superiority in this direction. It is only within very recent years that our attention, as brickmakers, has been generally and seriously directed to this branch of clay work.

In speaking of the designs in constructive brickwork as compared with those of the Paris Exposition of 1889, we refer to the little pavilions and exhibits shown at the two great fairs. In this respect, Chicago is at a great advantage; though we repeat, for the sake of clearness, the statement that the Old World has much to learn from us in the products themselves. It is in the artistic arrangement of brick that we have not been particularly happy.

RAILROADS AND INDUSTRIAL ENTERPRISES.

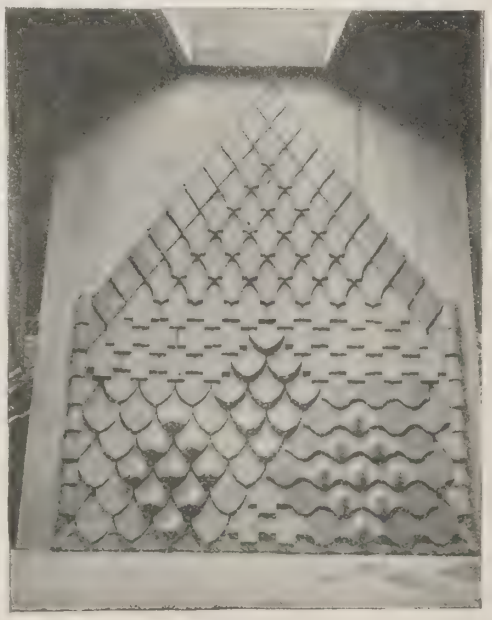
IT is a wise move on the part of certain railroads to make a strong effort to secure the location on their lines of manufacturing plants, and to further this the establishment of "Industrial Departments" under competent managers. Both the St. Paul and the Illinois Central have announcements in our advertising columns that will be of interest to those of our readers among the manufacturing class who are contemplating changing their location. Mr. George C. Power, at 58 Michigan Avenue, and Mr. Luis Jackson, at 160 Adams Street, Chicago, look after the industrial interests of the Illinois Central and of the St. Paul respectively.

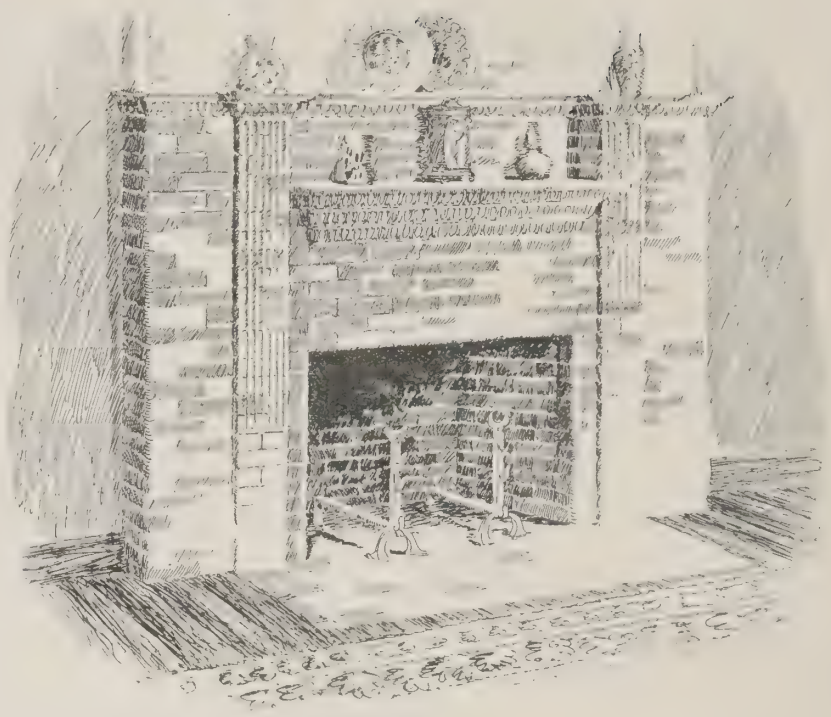
THE Cincinnati, Hamilton & Dayton R. R. have issued a handsome panoramic view, five feet long, of Chicago and the World's Fair, showing relative heights of the principal buildings, etc., also a handsome photographic album of the World's Fair buildings, either of which will be sent to any address postpaid on receipt of ten cents in stamps. Address D. G. Edwards, General Passenger Agent World's Fair Route, 2900 Fourth Street, Cincinnati, O.

THE CHICAGO SCHOOL OF ARCHITECTURE.

THE Armour Institute and the Art Institute combined, the former supplying scientific and mathematical instruction, the latter the artistic and technical, form a new school to be known as "The Chicago School of Architecture." It is intended to have it second to none in point of equipment or curriculum. The first term begins Sept. 14.

THE accompanying cut, from a photograph taken at the works, shows several forms of roofing tile manufactured by the Celadon Terra-Cotta Company, at Alfred Centre, N. Y. This company is working to perfect a series of tiles which will not only be capable of artistic use, but be so cleverly designed mechanically as to make them interchangeable and watertight. Architects who do not know the work of the Celadon Company will do well to investigate.





THE above sketch for a brick mantel is the latest design by the Philadelphia & Boston Face Brick Company. It is intended for a sitting-room, and has the special advantage that its width may be increased or diminished to fit almost any position. In the case of chimney breasts already built this is a strong point. The fireplace opening is three feet six inches wide, two feet six inches high, and one foot eight inches deep. The shelf is four feet six inches from the floor, while the entire width, if built as shown in the sketch, is seven feet six inches. Bricks numbered 117, 105, 101, 101a, 101b, 101c, and 101d are used, and the cost of the material in red is $41.35; in cream, $62.00. The bricks are carefully packed, and working drawings with dimensions and full instructions are sent, so that any good mason can put up the mantel.

AS OTHERS SEE US.

Louis Beezer, Architect, Altoona, Pa.: "Your journal is among the most welcome of the many that come to my office."

John J. Scanlan, Fennimore, Wis.: "Your paper is very interesting, and all contractors of building should take it."

A. Cameron, Architect, Salem, O.: "I am well pleased with THE BRICKBUILDER."

Herbert G. Paull, Architect, Toronto, Can.: "I value very highly THE BRICKBUILDER, and consider it probably the cheapest architectural publication brought out in America. I was looking over the whole of the numbers last week, and must express great satisfaction at the numerous good details introduced."

[It is only by looking through a complete volume that one can realize what a mass of useful material THE BRICKBUILDER contains during a year. — ED.]

THE BRICKBUILDER

VOL. II. BOSTON, AUGUST, 1893. No. 8.

ENGLISH CLAY EXHIBITS AT THE FAIR.

THE richness of England in natural resources specially valuable in the production of pottery has been taken advantage of to a very great degree, and clay in British hands has assumed forms and become possessed of qualities which have secured for this particular branch of their manufacture a position of pre-eminence and a most enviable renown throughout the world. Great Britain's exhibit in this special class is a most widespread and interesting one, marked throughout by a high standard of merit and great progressiveness in the endeavor to perfect old processes, to discover new, and to invest both with beauty of form and color. In departments where mechanical skill can confer the greatest excellence she stands almost unrivalled, and exhibits in many instances the highest developments that certain articles have yet attained; though it will be noticed that where the greatest merit lies in the application of other kinds of skill, this mechanical excellence becomes a danger, its too obtrusive presence imposing a repellent hardness on surfaces whose beauty, lying rather in the direction of softness of tone, and depth and harmony of color, belongs to that individualism in art to which machinery is so inimical. From the offices of the British Commissioners, which stand on the lake front, through the more ornamental exhibits in the Manufactures Building, to the samples of the various clays used in the production of bricks, faience, and pottery, which are to be found in the Mines and Mining Department, the display is one of a high order of technical skill, bearing witness to widespread scientific knowledge and great improvement in all methods of manufacture, from brickmaking to moulding and transfer printing. In the Mines Building the Farnley Glazed Brick Company of Leeds have some bath-tubs that are triumphs of manipulation, and some glazed brick, whose even and uncrazed surfaces are unequalled elsewhere; while Messrs. Maw & Company, and Messrs. Doulton & Company in the Liberal Arts Building, fully sustain in their displays this same high pitch of excellence.

Examining in detail this interesting exhibit, Victoria House, or, as its picturesque sub-title dubs it, "The offices for her Britannic Majesty's Royal Commissioners," first claims attention through size and general importance, being a substantially built house of brick and half-timbering rather pleasing in appearance, standing on the edge of the shore close to the battleship *Illinois*. Viewing its situation, one's first impression is that the architect perhaps misunderstood the location of the building he was called upon to design; for the imagination, which environs it with lawns, trees, and brilliant parterres of flowers, sees it gain in beauty, its proportions become better adjusted, and its whole appearance differ largely from the aspect it now presents, situated on a flat, sandy beach at the point of a cement walk. This gain would not be the purely adventitious one of beauty of tree and turf, but the effect that foliage would have in softening the outline, and the part that lawn and shrub would play in bringing gracefully to the ground the perpendicular lines, which now descend rather abruptly. It has another misfortune of position in being at the end of a road, advancing on which the spectator is enabled to see the building as a whole, which is the worst view of it possible, for, though nearly all parts are charming and interesting in detail, the general impression that one receives is an unsatisfactory one.

The house from its construction divides itself naturally into two divisions, one of which, the lower story of brick, is fairly good in proportion and general effect, except where the two windows cross, sharply and harshly in hard and unrelieved angularity of mullion and transom, the horizontal lines of brick and terra-cotta; the openings themselves being in anything but pleasing balance with the wall surface. The upper story of half-timbering is unfortunately entirely ruined by the depression of the gables over the portico, and the endeavor to restore to the centre its natural importance, lacking in consequence of this arrangement, by the introduction above of a belvidere which rises abruptly in the centre of a long and ugly line of ridge. This is as viewed from afar; nearer approach changes the effect for the better, and softens the rather monotonous appearance produced by overdone repetition of exactly similar features, by bringing one part

into closer view than others, thus creating a variation in the distribution of attention, with the consequent relief which is wanting when every feature has the same value and all appeal equally and at the same time.

The building in design is thoroughly Victorian in development and treatment, though drawing its inspiration, and depending for its characteristic features, upon that transitional period of English architecture, when the half-timber construction of country houses was beginning to yield in favor of brick, a slight admixture of later periods being found in the Elizabethan details of the porch and the large mullioned windows of the first story. The entire combination of the lower brickwork, marked by strong horizontal lines, and the half-timbering of the second story, with its perpendicular panelling and frequent gables, make an erection of solid and emphatic appearance, speaking of comfort and good living, but a building which one feels might have been touched into great picturesqueness, if not actual beauty, by the possession on the part of the architect either of a little more ideality or of a larger financial appropriation.

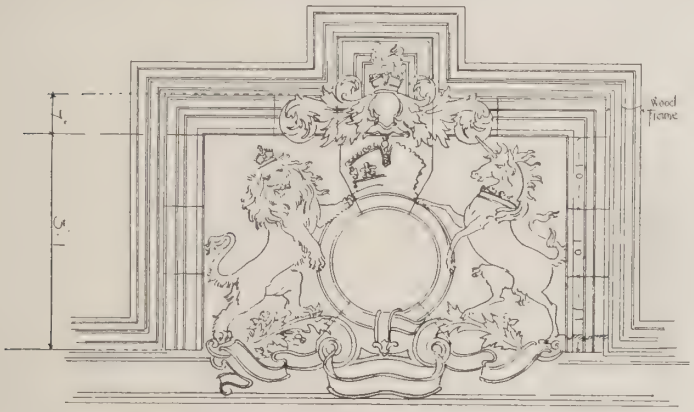
Analyzed and dealt with part by part, Victoria House pleases much more than when considered as a whole; the doorways are especially interesting, while the little fat columns of the porch, the various panels (of which the coat-of-arms reproduced is one), the enriched terra-cotta stringcourse, the angle decorations, and the profiles of the different mouldings, are all charming in design, well executed, and marked throughout by great consistency of feeling. The ornamental band which terminates the brickwork forms with the castellated wood moulding above it a very delightful line, whose decoration is quiet but most effective, and essentially English in character. It constitutes one of the happiest touches about the building, the union between brick and wood, with their different characteristics, being pleasingly effected; while its structural importance as a corbel supporting the upper story renders the emphasis conferred perfectly legitimate.

While sympathizing with the desire for horizontal lines which apparently led to the introduction of the yellow terra-cotta band courses, one could wish that this stratified effect, which is in pleasant contrast to the perpendicular

VICTORIA HOUSE, WORLD'S COLUMBIAN EXPOSITION. R. W. Edis, Architect, London.
For Scale Drawings see Plates 62, 63, and 64.

lines of the upper story, had been obtained by slightly differently colored terra-cotta; the introduction of these yellow lines in the red brickwork has an appearance of garishness even to eyes prepared in some degree by the view of many edifices in England, in which this rather crude mixture of colors is used. The substitution of a gray tint like blue granite, with the plastering of the second story kept whiter in tone than at present, would seem to do all that the yellow now performs, with the additional advantage of greater softness and harmony of surface. The present combination is rather violent, and jars somewhat, as does also the lack of sympathy or proper spirit in the treatment of the half-timbering above, which errs in the manner typical of nearly all the present attempts to reproduce this beautiful old style of construction.

In the old examples, whose beauty inspired this modern effort, the timbering, having actual work to perform, was proportioned to that work, which it performed honestly, in all the dignity of sincerity; the solidity and heaviness of the beams and uprights which are the prototypes of the thin and mean-looking pieces of to-day produced an



DETAIL OF TERRA-COTTA PANEL OVER ENTRANCE, VICTORIA HOUSE.

impression of truth, and beauty attendant upon honesty of purpose, which one may see in the surviving houses of this style in Kent and Surrey in England, and Normandy and Picardy in France, and which is very different from the result attained by the modern imitative effort to produce the same effect with 2″ x 6″s. To build with half-timber construction is one thing, and to build with the appearance of half-timber construction is another. In the latter the simulative pieces become merely decorative, are distributed with regard only to surface effect, and consequently a certain appearance of weak elegance replaces the vigor and truth of the legitimate method. It is, therefore, a matter of regret that the spirit of thoroughness shown in the lower story of the British Building was not employed in the construction of the upper. The garden or lake front differs from the west elevation in having both stories built in brickwork, and, though possessing fewer points of interest, is better in massing and in general effect; but everywhere is felt the lack of a hand that might touch into grace and soften many lines that now are harsh, and bestow a picturesqueness of which the building is perfectly capable.

The interior is most comfortably arranged and well fitted up, but contains nothing of interest from the point of view of THE BRICKBUILDER, with the exception of a terra-cotta Tudor arch, over the ingle-nook in the drawing-room. The terrace overlooking the lake possesses a fountain of colored Doulton ware, without which it would be much better off, as there is nothing in the design to recommend it, and the color is a most discordant note among the surroundings.

The very good terra-cotta in the walls, windows, and doors of Victoria House came from the Northwestern Terra-Cotta Works; and the Fuller Construction Company were the general contractors. It is interesting to note, in connection with the windows of the lower rooms, that the terra-cotta mullions and transoms all show on the inside, and are not cased in any way to correspond with the wood finish of the rooms. The sashes and hinged frames are all of iron, and the entire arrangement is satisfactory in appearance and with regard to all practical points concerned.

The question of bond in connection with the various examples of brickwork at the fair is rather complicated and full of apparent paradoxes. In the Van Houten Cocoa House and the Blooker Cocoa Mill, where one, from association, would expect to find walls laid in Flemish bond, the method known as English is employed; while in the walls of Victoria House, and a piece of brickwork illustrating a section of the corridor walls of the London Courts of Justice, instead of that arrangement of bricks distinguished by the name of the country from which these exhibits come, we have the different one with which bricklayers in this country have rendered us familiar, and which may be with propriety called American bond. The architectural exhibit in the Art Gallery furnishes us with another international complication of this sort, for in Mr. Bloomfield's water-color perspective of his design for No. 20 James Street, Buckingham Gate (1025 in the catalogue), we have a most charming residence in which that alternation of headers and stretchers known as Flemish is carefully depicted. This state of affairs is more simply explained than at first appears possible by the following statement of facts, which are not very well known, and which are given on the authority of the Encyclopædia Britannica.

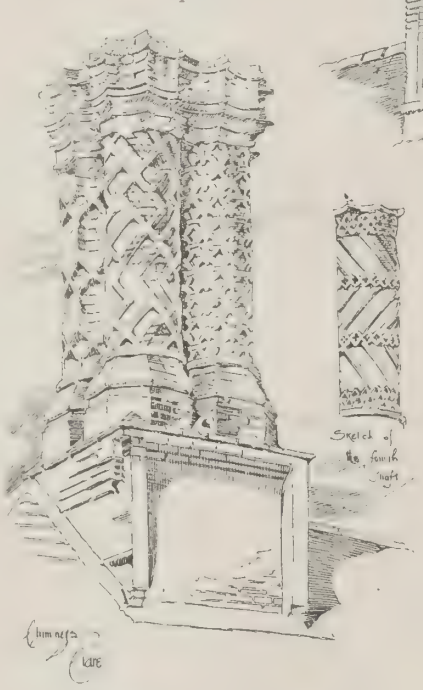
What is in England called Flemish bond is unknown in Flanders, and is practised in the British Isles alone. In Flanders, Holland, and Rhenish Germany, which are bricklaying countries, no bond is found but what is known in England as English bond, though the mediæval brick buildings in the northeast of Germany are worked in Flemish, or, as it is called there, cross-bond. Many of the buildings designed by Inigo Jones, and nearly all Sir C. Wren's, are executed in Flemish bond, which name, it has been suggested, might have been derived from the word "flemishing," used by workmen, and thus applied to brickwork, as meaning work better "finished off" than the other kind.

The design by Mr. Bloomfield, to which reference has

been made, hangs in the British architectural section of the Art Gallery, and is accompanied on the walls of that department by many charming designs for various kinds of brick buildings. The house in question is most quaint in design, and attracting at once, as it does, by the daring of the rendering, also holds and enchants by its individuality and breadth of treatment. It exhibits, as does occasionally the delightful work of Messrs. Ernest George & Peto, a certain lack of discrimination which leads architects working in a certain style to adopt the ugly lines as well as the beautiful ones of their particular period, and to this is due the only weak spot in the design, which is the curve of the top of the bay at the fourth story; otherwise Mr. Bloomfield has designed a most charming and individual city house. No. 1107, New Church, at Miles Plating, Manchester, Leonard Stokes, architect, is a Victorian essay in the development of late Perpendicular, impressing at once with the strength and simplicity of conception, and pleasing much with the disposition of ornament and freedom of detail.

The perspective (a very well-done pen-and-ink) shows one end of a church, noticeable for a huge window, with a flat gable above it flanked by two finials similar in arrangement to St. George's at Windsor, but treated with the same freedom that is shown in the works of the late John Sedding. The remainder of the edifice is not shown, so one is unable to judge how far this good piece of detail is representative of the whole.

In No. 1018, Messrs. Ernest George & Peto exhibit some of their charmingly rendered designs replete with the picturesqueness — in this instance Belgian in origin — for which this artistic firm is noted. The sketches are of great interest both as drawings and brick designs, and are full of the element which is so lacking in Victoria House. The perspectives of Shiplake Court, hanging near, display the same charming characteristic, especially in the courtyard front, where a low, square tower of brickwork and a half-timbered gable are in effective juxtaposition.

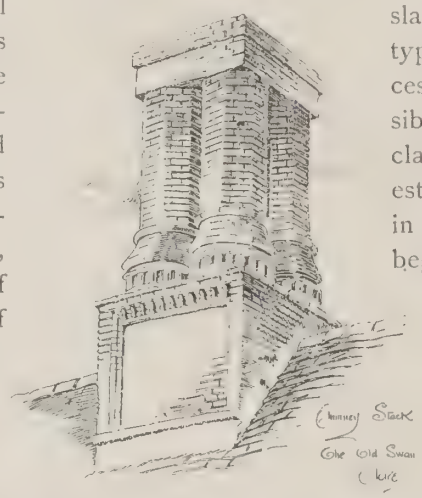


CHIMNEYS IN EAST ANGLIA.
SKETCHED BY JOHN SHEWELL CORDER.
(*The Builder*, London.)

An examination of the British exhibit in the department in which clay plays such an important part will be marked by great interest for any one connected directly or indirectly, or concerned in any way, with the manufacture or use of pottery in its various forms of bricks, tiles, and terra-cotta. These remarks do not by any means exhaust the subject, but other parts can be best treated in comparative consideration with similar products of other countries; and notice of them is deferred until such occasion may offer. GEORGE M. R. TWOSE, Chicago.

HOLLOW BUILDING BLOCKS OF BRICK.

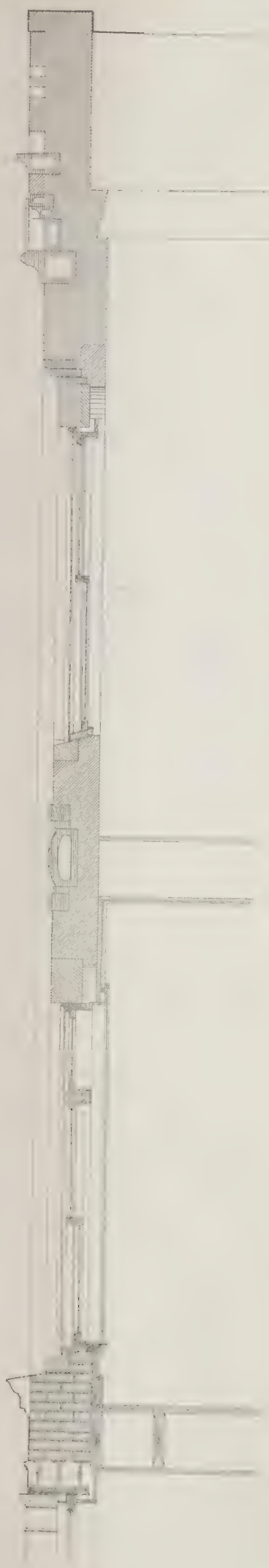
THE recent meeting of the Ohio Brick, Tile and Drainage Association gave occasion for the presentation of several interesting papers on the general subject of the manufacture and use of hollow bricks and tiles in building construction. The use of brick and terra-cotta has come down to us from unknown antiquity, but every one who considers the question must feel impressed with the conviction that builders have been content for centuries slavishly to follow the stereotyped fashion of their predecessors, and that the great possibilities residing in the plastic clays as the basis for the highest order of decorative effects in form and color have scarcely begun to be understood. We have fairly begun to realize, in the use of glazed or enamelled bricks and tiles, what may be accomplished in blending beauty of coloring with durability; and in the use of moulded terra-cotta some conception of the capabilities of these materials relieving the monotonous uniformity of the brick wall: but the idea that splendid architectural effects might be secured by the artistic coalition of both, if it be entertained, has certainly not been generally realized. To our way of thinking, the artist who will devote himself in the service of architecture to the task of developing this field, will find a vocation for the exercise of the noblest gifts of genius.

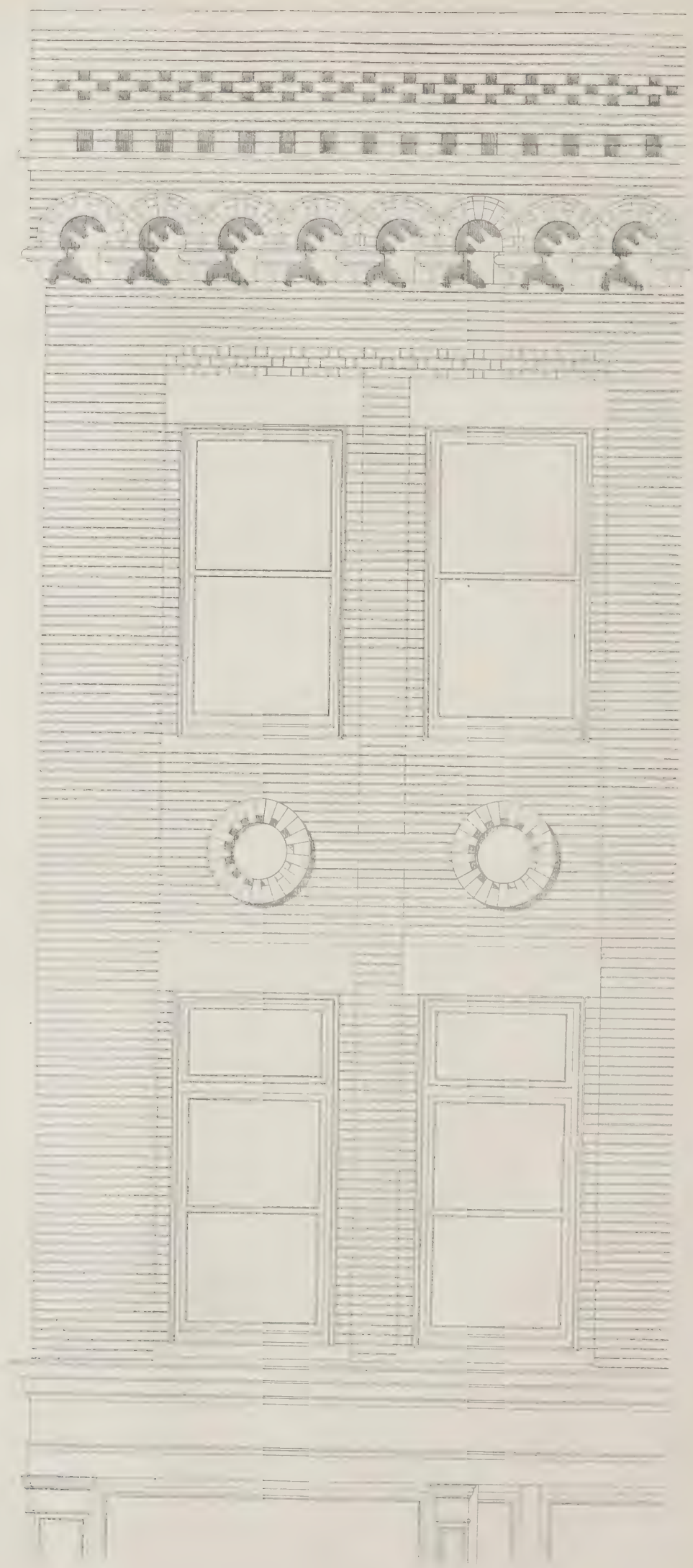


At the meeting above referred to, it was held, and with good reasons therefor, that, by the judicious application of hollow building blocks, houses could be built without vertical air passages, with walls composed entirely of incombustible material, that will be warmer in winter and cooler in summer, that will require no paint, and will never decay; that by the use of such hollow bricks, made and laid in shapes, proportions, and colors that will be pleasing to the eye, a far more comfortable dwelling may be constructed than by the methods in vogue; that painting, or papered walls can advantageously be dispensed with; and that the natural colors developed by burning of the clays will be found to yield a wealth of coloring finely adapted for the exercise of good taste, and affording a wall vastly more wholesome and permanent.

It is gratifying to find an association of manufacturers, engaged in the production of clay products, occupied with the consideration of subjects of such importance as these. With such encouragement as the architects could give them, were they sufficiently appreciative of the situation, we would see magnificent works of architecture erected from material that we are accustomed to associate only with permanence and simplicity. — *Builders' Gazette, Pittsburgh.*

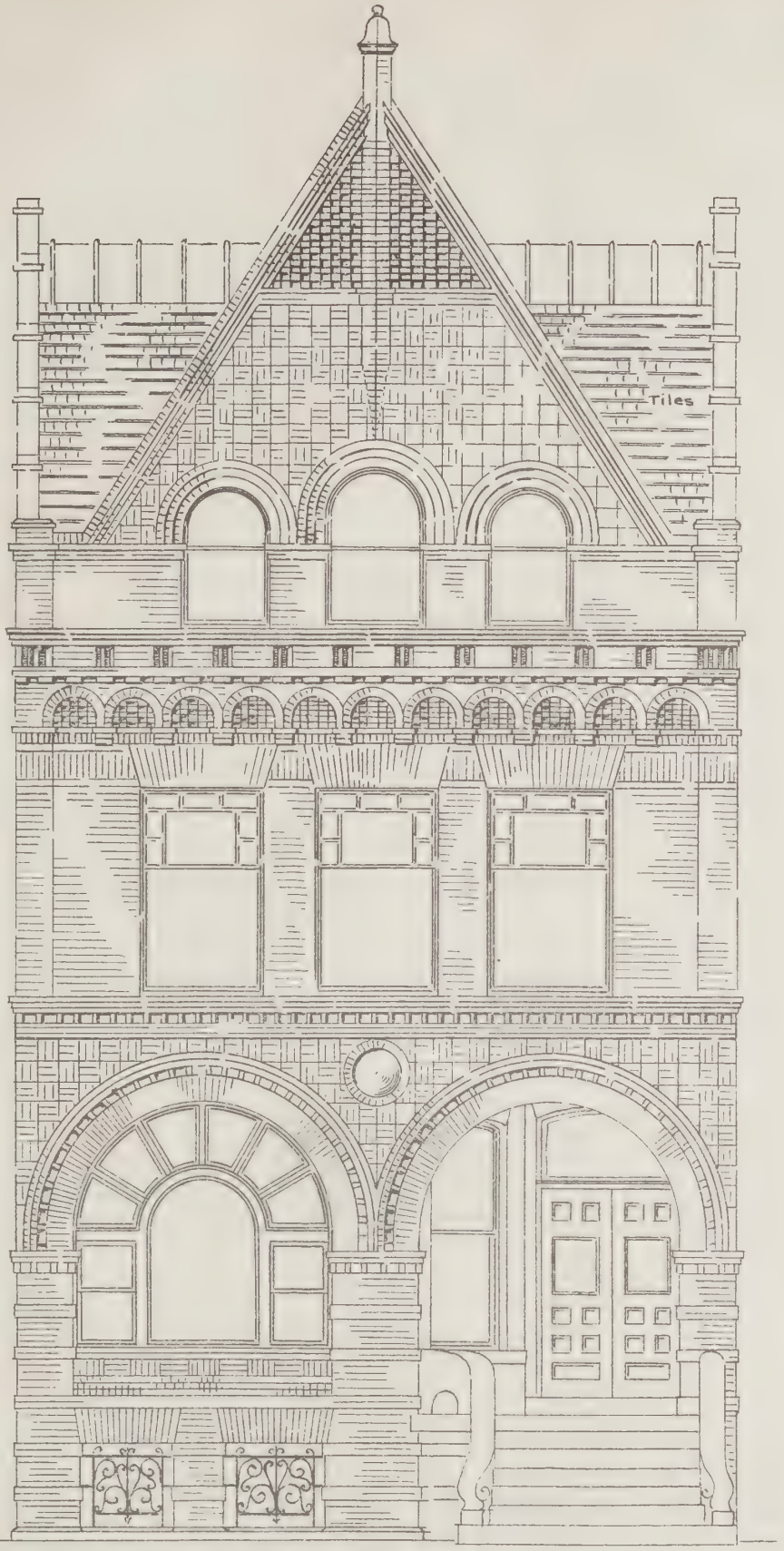
JENNINGS BLOCK, FALL RIVER, MASS.
J. MERRILL BROWN, ARCHITECT, BOSTON.



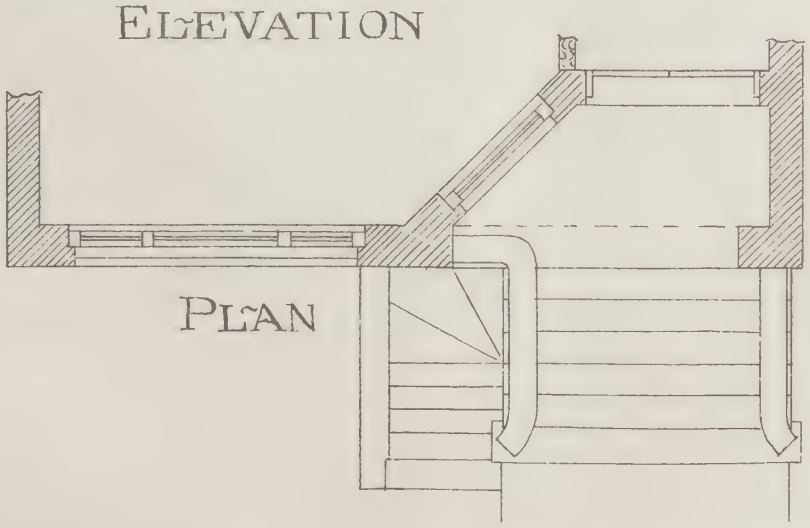


JENNINGS BLOCK, FALL RIVER, MASS. DETAIL OF BRICKWORK.

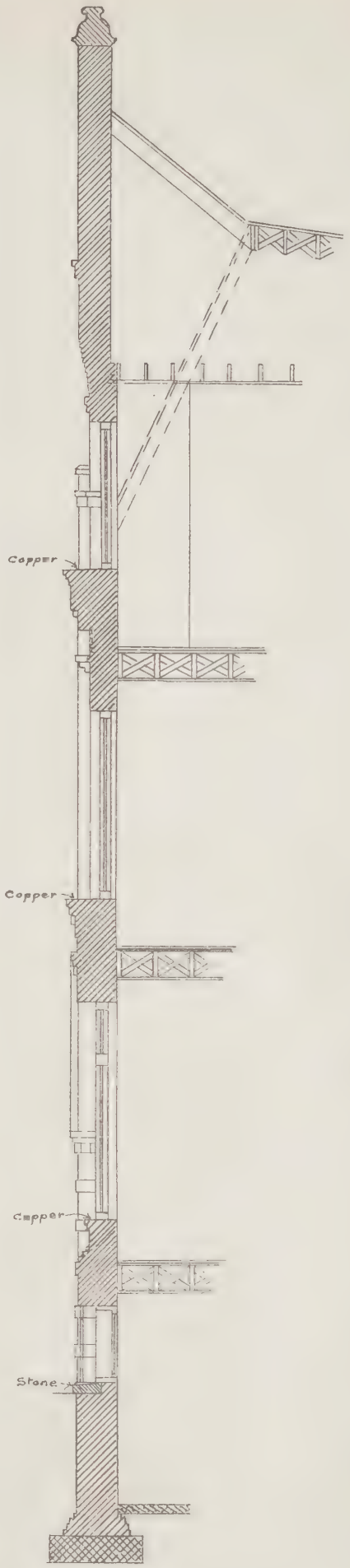
J. MERRILL BROWN, ARCHITECT, BOSTON.



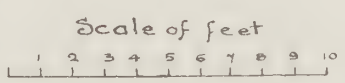
ELEVATION



PLAN



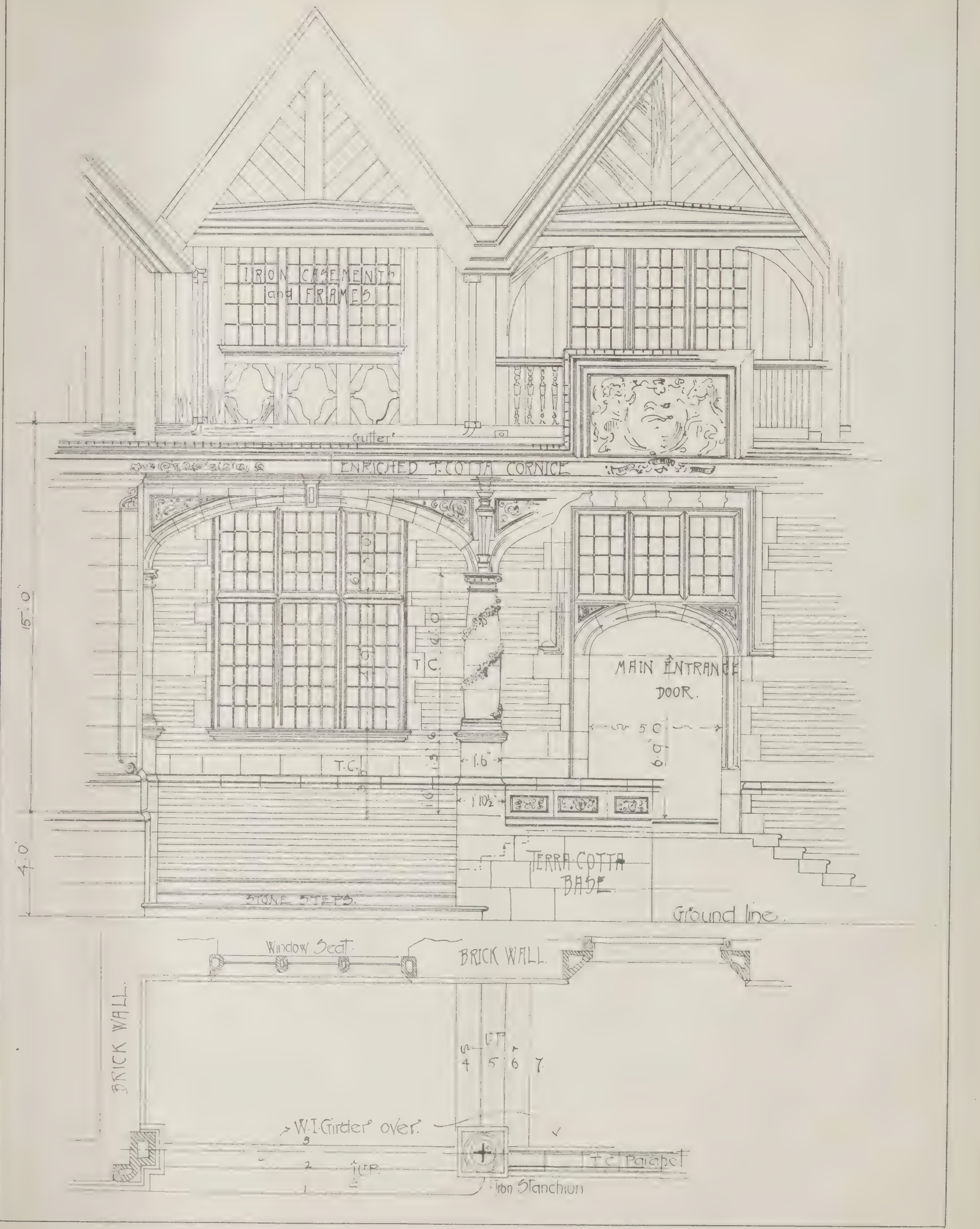
SECTION



DESIGN FOR A TOWN HOUSE ON A TWENTY-FIVE FOOT LOT.

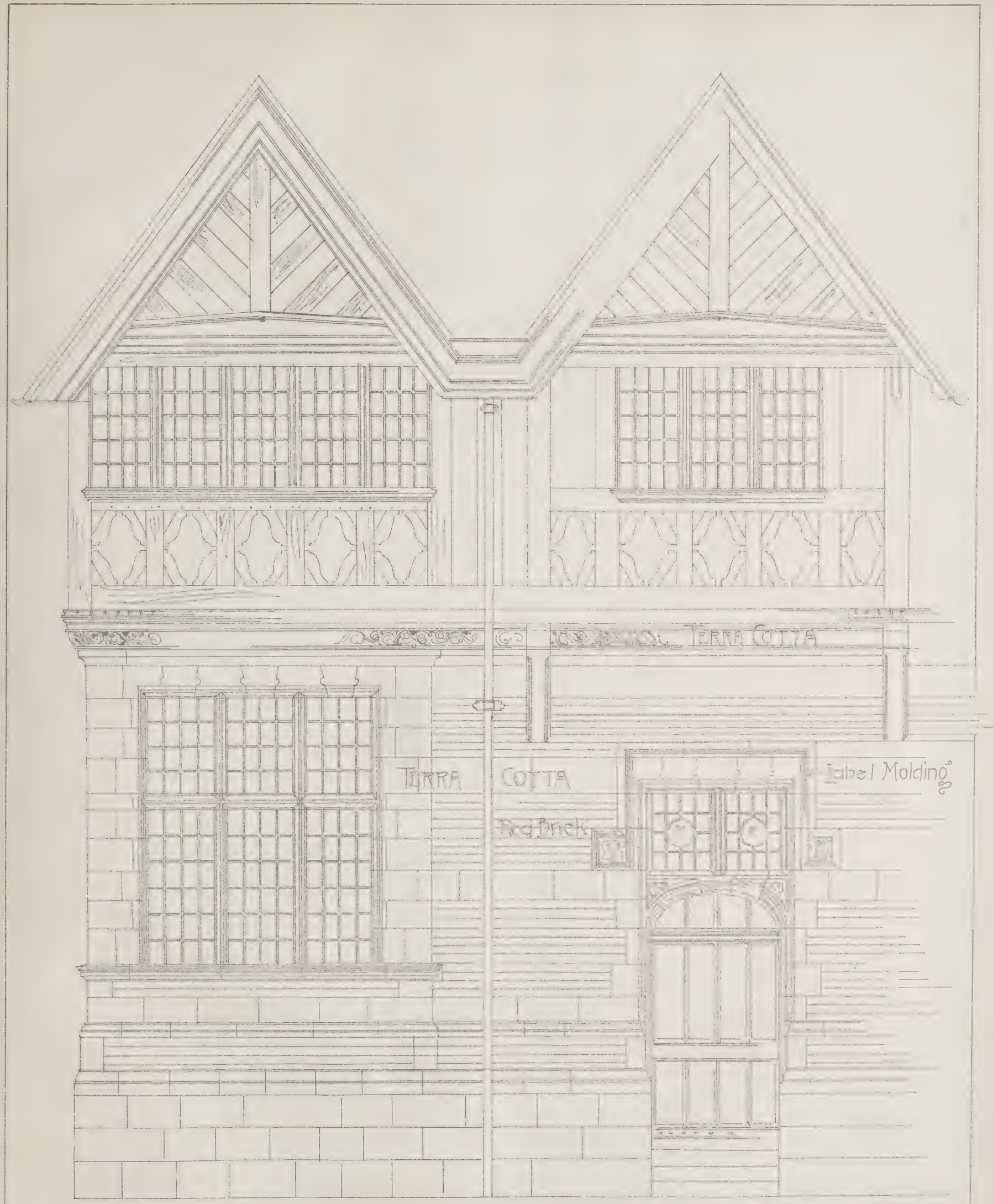
T. B. ELLISON, ARCHITECT, DECATUR, ILL.

FRONT ELEVATION, CHICAGO HERALD BUILDING.
BURNHAM & ROOT, ARCHITECTS, CHICAGO.



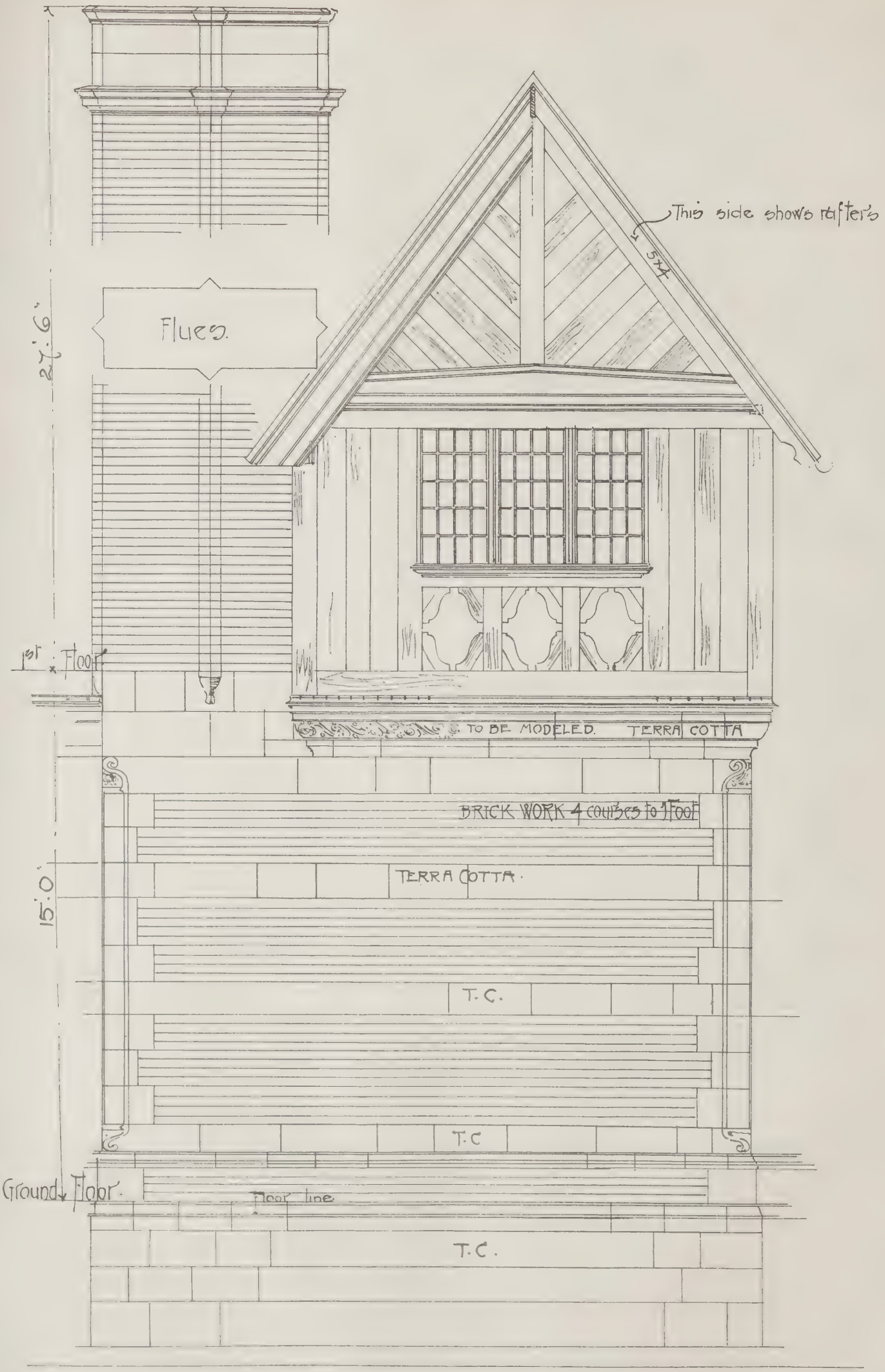
PLAN AND ELEVATION OF MAIN ENTRANCE, VICTORIA HOUSE, WORLD'S COLUMBIAN EXPOSITION.

ROBERT EDIS, ARCHITECT, LONDON, ENG.



ELEVATION OF SIDE ENTRANCE, VICTORIA HOUSE, WORLD'S COLUMBIAN EXPOSITION.

ROBERT EDIS, ARCHITECT, LONDON, ENG.



DETAIL OF EXTERIOR OF INGLEWOOD, VICTORIA HOUSE, WORLD'S COLUMBIAN EXPOSITION.

ROBERT EDIS, ARCHITECT, LONDON, ENG.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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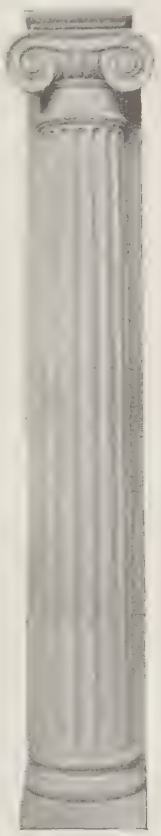
No person, firm, or corporation, interested directly or indirectly in the production or sale of building materials of any sort, has any connection, editorial or proprietary, with this publication.

THE terra-cotta details on this page are from the new Jefferson building on Washington Street, Boston; Shepley, Rutan & Coolidge, architects. The work was done by the Boston Terra-Cotta Company.

ARTICLES and illustrations have from time to time appeared in English architectural journals, showing that considerable attention was being paid to dwellings for the poorer classes. Recent illustrations have given a more definite character to our own ideas, so that we can now state them in a general way, and we trust they will bring out other expressions of opinion.

How many of the large mill corporations provide for their operatives anything but the barest, barn-like houses thrown cheaply together? It is true some mills have made an attempt to do something better, but in the majority of cases it is the same dismal, unhomelike collection of white or brown houses, close to the street, with dirty dooryards, broken or missing gates (where they have gone so far as to build fences), and squalid surroundings. Aside from all humanitarian views, is this state of affairs profitable to the corporation? Could not a better, more skilful, more intelligent class of operatives be secured by a mill which maintained homelike and attractive cottages for its employees?

Brick — common, ordinary brick — is the best and really the cheapest material to give durable and artistic effects. Imagine, in place of the dreary frame structures, a row of cosey, cheerful cottages, not one design repeated over and over, but enough variety to give character and individuality to each man's home. In front of each house a little piece of ground, of only two hundred square feet, perhaps, in which flowers can be grown. A low, brick wall, with gate or turnstile, would protect the plat from encroachment, if any were to be feared; otherwise, it would serve to make the place more the occupants' special dominion. Hardy vines, — clematis, for example — planted in corners or against the house, would soon take possession of the bare wall surfaces.



But we would not stop at the exterior. With any encouragement, our large manufacturers of terra-cotta lumber and fireproofing materials would soon make it possible to build partitions, floors, and roof of various forms of terra-cotta, as cheaply as they could be built of wood; and they would be ten times more durable, and absolutely fireproof. Let no one say this cannot be done. It is, we believe, only because it is so small a problem that it has not been already solved. The minds that have evolved the modern fireproof office building are fully able to solve the dwelling-house problem, once let there be a demand for such construction. Mr. Edward Atkinson has already devoted considerable time to the application of mill construction to workmen's houses. Is there no one who will take up the much more feasible method that fireproofing makes possible? We believe that, from the very curb to the back door, clay building materials could be used to make cheaper, more durable, more safe, more comfortable houses, supplanting wood, plaster, and many other materials very largely, saving labor, saving repairs, keeping out vermin and disease germs, and contributing in every way to the health, happiness, and intellectual advancement of the occupants.

THE particular branch of the clay-working industry devoted to fireproofing is yet in embryo. Its possibilities are endless, when the same general principles are wisely applied to all kinds of structures. We believe that it will not be long before fireproof buildings of all sorts are the rule. Every disastrous conflagration is leading us to more serious consideration of building to avoid these losses. We have, as Mr. Atkinson has said, "no science

of clay"; we really know nothing of the material, of its ultimate possibilities. Why? Because it is so common? Because it is nearly everywhere at hand? So much the more reason why we should know its every characteristic. Stone is a building material of the dark ages that are rapidly disappearing. Clay is the material that accords with advances the world has made in science and the practical arts. In our admiration of brick and terra-cotta as a material for artistic use, let us not overlook those uses most in sympathy with modern science. We purpose carrying this subject further by special articles, at an early date. Meanwhile we invite "open letters" from all who have given thought to the matter.

IT looks as though Philadelphia is becoming ashamed of her "Philistinism" in architecture and providing abundantly for the proper education of her architectural students. The Department of Architecture of the University of Pennsylvania, under the direction of Prof. Warren P. Laird, is already well established, though there is danger that the same over-attention to mechanical, mathematic, and scientific studies, that once characterized the Institute of Technology course, will prevail at the University of Pennsylvania. Students at the Institute were once required to study the strength of shafting, the delicate methods of weighing, and play at sundry other games laid out for them by the professors who persisted in considering architecture an industrial science, and did their best to eliminate an "art idea" which led to weakening columns by taking out material at the top in order to make them taper, and was responsible for proportions that were not figured from tables of tests.

TERRA-COTTA PANEL.

RESIDENCE OF GEORGE M. FISKE, ESQ. (PRESIDENT OF THE BOSTON TERRA-COTTA COMPANY), AT AUBURNDALE, MASS.

The latest addition to educational opportunities for architectural students in Philadelphia bids fair to be one of the best, so far as its scope extends, in this country, inasmuch as the committee in charge of the work consists of Messrs. Wilson Eyre, Jr., John Stewardson, of Cope & Stewardson, and Thomas M. Kellogg, of Rankin & Kellogg. The new school is to be a department of the Pennsylvania Museum and School of Industrial Art, and is to open Oct. 10. L. W. Miller is the principal, and Julian Millard, instructor in architecture at the University of Pennsylvania, will act in a similar capacity in the new school. From the *personnel* of the committee, we can expect as careful instruction as that given by any American school of architecture.

THE JENNINGS BLOCK.

THE building illustrated on plates 57 and 58 of this number stands at the corner of Pleasant and Second Streets, Fall River, Mass. It is seventy-nine by sixty-five feet, and cost $35,000. The main part of the structure is of light cream brick from W. H. Gates, 30 Kilby Street, Boston, with terra-cotta trimmings in two shades of light, soft red, so used as to emphasize the details and make up for loss of light-and-shade effect, which the main front, facing north, lacks. The terra-cotta is the work of the Boston Terra-Cotta Company. The mortar is colored brown, with stain, and the wood and iron work is painted in two shades of red to harmonize with the terra-cotta. What stone is used is light cream-colored Ohio. The upper story is one large drill hall, while the second story is occupied partly by offices and partly by the militia as an armory. There are three stores in the first story. J. Merrill Brown, 53 State Street, Boston, is the architect, and Joseph M. Darling, a prominent Fall River contractor, is the builder.

THE RAILROADS.

FACTORIES GOING SOUTH.

THE Illinois Central is making an admirable endeavor to develop that section of the country adjacent to its lines, south of the Ohio River. Within the past three months it has located six plants, — one at Shaws, Miss.; one at Cruger, Miss.; one at Winona, Miss.; one at Fort Jefferson, Ky.; and two at Baton Rouge, La. These plants are all woodworking industries, brought respectively from Indiana, Ohio, Pennsylvania, and Wisconsin. Industrial Commissioner G. C. Power is evidently handling the department with great success and to the decided benefit of the Southern country.

READING'S NEW INDUSTRIES.

B. P. CONWELL, the "locater" of the Reading Railroad, whose especial duty it is to bring together the manufacturer seeking a site and the land-owner with property for sale, has been so successful during the past year as to induce two hundred new industries to locate along the lines of the Reading. After a recent trip over the road, Mr. Conwell reports that the manufacturing industries situated thereon have shown a noticeable evidence of recuperation. This recuperation, he believes, is due in a great degree to the excellent advantages of a location on the line of the

Reading system in proximity to supplies of raw materials, closeness to consumers, unexcelled transportation facilities, and the extremely reasonable cost of living. A portion of the region traversed by the Reading is the garden spot of America. Low rates of freight and cheap coal have developed the agricultural and manufacturing industries along its lines to a marvellous extent in recent years.

RAILROAD NOTES.

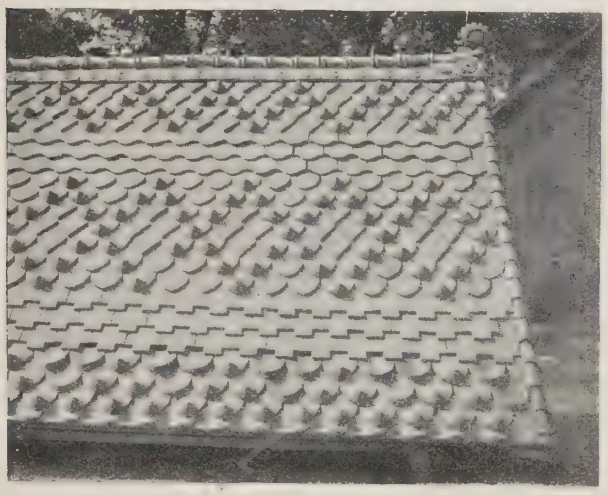
THE Chicago, Rock Island & Pacific has extended its system into Texas.

THE Chicago, Burlington & Quincy is now running solid trains from Chicago to Galveston.

H. E. DEWEY, superintendent Eastern Division, New York & New England, has moved his headquarters from Putnam, Conn.

SINCE severing its connection with the Reading system, the Lehigh Valley has been appointing many of its old officers to former positions.

NINE hundred and eighty miles in two minutes less than twenty hours is a record of the "Exposition flyer" over the New York Central and Michigan Southern.



THE above illustration shows very clearly the idea of the Celadon roofing tiles. They are so cleverly designed mechanically that the range of ornamental work possible is immense. The company does not lose sight of the fact that such a system must also be provided with special eave, gable, and ridge tiles, and has prepared a correspondingly full line of these special shapes. One of the important contracts recently closed is that for the Carnegie Library at Pittsburgh. The horn tile shown in the cut makes, by the way, an effective snow-guard. The main interests of the company are represented by Mr. E. L. Hyde, 30 Cortlandt Street, New York.

A CORRESPONDENT for THE BRICKBUILDER is wanted in every city and large town in the United States. For full instructions and terms address, enclosing stamped and self-addressed envelope, the Editor.

SAN FRANCISCO ARCHITECTS.

A CRITICISM BY A SAN FRANCISCO NEWSPAPER.

THERE seems to be just a trifle more jealousy among local architects than any other class of citizens. If one architect designs a building, nine tenths of the other men in business say mean things about it. They either ridicule the design or assert that the specifications are all wrong. The New City Hall dome, designed by Frank T. Shea, is now in evidence, and the architects say that they do not like it. They think that the matter of the selection of the dome should entail a little competition, and therefore they are most profuse in their condemnatory speeches. If they were all peevish old maids, they could not appear in a more ridiculous light than that in which they are now exposing the disgusting nakedness of their conceit. Prominent among the kickers is an arrogant and beardless youth who poses as an architect and artist. The monument to his idiocy is a building in the Western Addition which he designed. Its features are a chimney that runs into a bath tub and sleeping-rooms in which it is impossible to stretch a leg. It is a somewhat singular fact that we have no architect of marked ability in this city. That is why there is no originality in the style of our buildings.

FORT SHERIDAN, ILLINOIS.
HOLABIRD & ROCHE, ARCHITECTS, CHICAGO.

THE above cut is a general view of the new United States Army post recently established near Chicago. It is looking across the parade ground. The buildings are entirely of light brick, and the tower is a strong, massive structure, well designed and executed. Messrs. Holabird & Roche of Chicago were the architects.

ORNAMENTAL patterns in brickwork can be worked out by decided differences in color, but it takes a high order of developed skill to handle color under any circumstances, and very few people are educated in this way. We suggest the use of only slight differences in color; for instance, a light red and a very dark red, or two colors of brown, but never departing very largely in the shading. — *Clay-Worker.*

AMERICAN vs. ENGLISH FLOOR TILE.

From the Clay-Worker.

NEARLY every story is a continued one. Particularly is this true in the records of happenings in real life. Several months ago we said something about the English tiles which were put down in the Denison house, one of the largest and best hotels in Indianapolis, and spoke of their generally unsatisfactory condition, and mentioned this as being true not on account of the workmanship but rather on account of the tiles themselves. Their color, form, and texture were bad. Following that statement some time later came a notice of our remarks through the *British Clay-Worker.* This was critical if not pointed, and took exception to our statement that "education will develop the right thing, and the English product will stay on the other side of the water." The *British Clay Worker* replied: "As it happens, however, that particular kind of education can hardly be said to be making very rapid strides."

We never completed the Denison House story. After our criticism was made, the proprietors of that hotel refused to make settlement with the company who did the work. The matter was arbitrated, and a very substantial cut was made from the bill. Now we have another point to recall. The Denison House subsequently enlarged their building, made additions to their lobby requiring more tiling. They had had "the education which developed the right thing," and the English product, as far as they are concerned, "stays on the other side of the water." They had had their experience; they profited by it. They purchased American tiling. The two jobs now may be inspected and compared one with the other. Those making a careful comparison will have no difficulty in distinguishing the American from the imported tile, for it is superior in every way.

SPECIAL cornice number of THE BRICKBUILDER, 25c.

FRENCH BRICKWORK.

Extract from the Clay-Worker.

THE accompanying illustration is of a building of the fifteenth century, at Gien, in the province of Loiret, France. This is a very successful structure; nevertheless, if we were to undertake to duplicate these forms, say with red and yellow brick, the result would be awful, the contrast would be too great. It requires a very nice discrimination to use the best of information. Here we have some very beautiful patterns of brickwork. This comes to us in the light of information. Yet with this information at hand we may yet be worse off with it than without it. It may lead us to be hazardous. We may feel that we are justified in doing something which we are not. If we were to examine this building carefully on the spot, we would find that there was a very slight variation in color, and for that reason the wall surfaces are merely relieved of their absolute plainness. Their breadth and size are not emphasized by great splotches of color. This is where we make our mistake. We take incomplete information that comes to us from photographs and go to extremes. We have examples of failures of this kind in our own city, and we see many of them elsewhere.

BUILDING AT GIEN, LOIRET, FRANCE.

A very beautiful effect is secured in connection with the use of decorative brick by mere difference in texture. For instance, if we take a pressed brick and give it a pitched face, that is, a face which corresponds to quarry face in stone work, the rough surface of the brick, when thus pitched, gives an entirely different texture, and hence can be used very satisfactorily in patterns of the general character which are shown in the picture on this page.

The above suggestion is made on the side of safety.

THE BRICKBUILDER

VOL. II. BOSTON, SEPTEMBER, 1893. No. 9.

MURAL DECORATION TILES AND ENAMELS AT THE FAIR.

FROM Susa, Persia, to Lambeth, London, is a far cry; the walls of the palace of Artaxerxes and the walls of a Christian church are still farther removed from one another; 2000 B. C. appears, from the point of view of A. D. 1893, to be a period too remote for us to see it aught but dimly: and yet, judging from the faience exhibits at the World's Fair, Susa and Lambeth, the house of the Persian monarch and the ten thousand houses of the Galilean peasant, the mist-obscured depths of that "dark backward and abysm of time," and these bewildering, glittering, *fin-de-siècle* moments, are all united in one kingdom and time under the rule of a power whose influence no time can weaken and whose borders stretch beyond the reach of human ken.

The desire for beauty runs like a golden thread through all periods, and men blindly and passionately reach forth after it, impelled by those mysterious emotions which, common to all men and ages, have created religion and art, binding the then to the now, making an interval of centuries no barrier to artistic sympathy, which, transmitted through ages, enables the artist of to-day to know, appreciate, and understand his fellow of earth's younger years. To M. Emile Muller et Cie., of Ivry Port, near Paris, and to Messrs. Doulton & Co., of Lambeth, England, it is that thanks are due for the opportunity to compare easily archaic wall decorations and the latest developments in the art of decorating walls. This distinction is purposely made; for, while the Frenchman's exhibit shows ancient Persian decoration to be an organic part of the structure it beautifies, the English method is similar to the use of marble in the Italian churches of the Middle Ages, and the tiles (reference here is made to the beautiful dry impasto examples) are merely an applied veneer having no embodiment in the walls to which they are attached.

The use of enamels for decorative purposes is very early, and was brought to perfection by the Egyptians, their coloring being very brilliant and the glazes pure alkaline free from lead. The most remarkable examples extant are some clay plaques, now in the British Museum, about ten inches high, which were used to decorate the palace walls of Rameses II., at Tel ah Yáhúdíya, and these date from 1300 B. C. This enamelled decoration represents men and animals in procession, which are executed in different colors, being partly modelled in slight relief, and then covered with enamel, the negroes being black, other figures white, red, or yellow; while the dresses are represented with the greatest richness and minute attention to detail. During the eighteenth and nineteenth dynasties, pottery was used in many ways for wall decoration, among other methods bricks of coarse clay being covered with "slip" (a mixture of finer clay, which is applied to the brick as a "face") and glazed with brilliant colors. In Persia, work of this character was widely used, the wall being modelled and the figures enamelled as in Egyptian work, the ground being generally of different colors and the work showing strong feeling of harmony and great vigor of line, and skill in decorative arrangement.

It is work of this character that Emile Muller exhibits, copied in modern materials with great faithfulness from the Frieze of Lions and the Frieze of Archers, once forming part of the palace of Artaxerxes at Susa, Persia, brought thence and placed in the Louvre by Mons. et Mme. Dieulafoy. This copy is a reduction in general, but the bricks are the size of the originals, differing from the Persian chemical composition, however, in being formed of a silicious composition which M. Muller calls stoneware. This material seems to have great hardness, and qualities of endurance, imperviousness to frost, etc., and is a specialty of this firm, who used it to an enormous degree in the balustrades, domes, friezes, medallions, etc., etc., of the last Paris exposition. These hollow stoneware bricks are arranged to form a low wall enclosing a bank of earth, in which plants and palms are planted. The front and two side walls of this enclosure are about three feet high, and round them marches in stately single file a procession of that kingly beast, the lion. The rear wall is some ten or fifteen feet high, and on it, beginning at the level of the top of the lower walls, is a panel, occupying the entire area, consisting of a wide border and a centre representing a procession of archers.

In order to understand the extraordinary vigor and bold appearance of this work (descended from times

EXHIBIT OF EMILE MULLER.

which we are apt to consider artistically unenlightened), it must be kept in mind that these figures of men and animals are not modelled and then applied to the surface, but are formed by the proper modelled advance and retreat of the bricks forming the wall, and that the joints of the brickwork are not interrupted at all but continue both horizontally and vertically through all the modelled surfaces. Therein lies to a very great degree its artistic merit, and we cannot but admire the ability with which the artist, needing a beautiful wall surface, instead of endeavoring to obtain it by any decorative veneer, has boldly seized upon and converted into a thing of beauty the wall itself; touching its surface into life, designing and executing with a perfect knowledge and mastery of his materials. The coloring is very harmonious and beautiful, and it may here be observed that this quality characterizes all the work of Mons. Muller's exhibit; most of the articles are reproductions of antiques, and it would seem as if Mons. Muller was as appreciative of old tone as of old forms, for the softness of his colored stoneware is delightful, and a revelation to the eye accustomed to the brilliant and rather garish tints which most manufacturers seem to prefer.

Great softness of tone is obtained by the Persian enameller by avoiding large surfaces of self-color, and his background is a beautiful blending of yellow and brown, and a green deepening into a peacock blue, which colors are those used in tinting the beasts and the archers. The tints which in the figures sometimes cover three or four bricks are in the background so arranged that the three colors are all mixed in varying amounts of each, on nearly every brick; this gives the men and animals sufficient prominence, without rupturing the relationship that exists between them and the groundwork, for they are of the wall and not a foreign element on it. A new tone is used in the archer frieze, a portion of the drapery being colored gray.

The bricks are six inches by three inches on face and are built in wide cement mortar joints. Other times, other manners, seem to be true; to this we might add other ideals, but whatever the cause, this fine and vigorous piece of work, bequeathed by a race of lion-hunting warriors, is as different from the rather febrile wall decoration of to-day as the untamed king of the forest and desert is to the animal we cage, and cow with a whip. Both they of to-day are very tame. The work has been discussed from its more interesting standpoint as an example of early work, but due credit must be given to Mons. Emile Muller et Cie. for the cleverness of their adaption and the beauty of their work. It is a matter of great regret that this firm has not thought it necessary to send over any floor or wall tiles. French methods and ideas would have been most interesting in comparison with those of America, Spain, Italy, and England; the entire section, however, is barren in this respect.

It must be confessed that with few exceptions the tiles that are exhibited in the Manufactures Buildings are not such as would captivate the attention, or of such beauty as to create general desire for their extended use as wall decoration; indeed, the imagination rather shrinks at the idea of inhabiting any room whose walls were formed of the hard mechanical and commonplace specimens which form the bulk of the output of to-day. The reason for this is hard to find, for, while their use in this capacity is a comparatively new one in northern countries, the Orient has known and appreciated their capabilities of mural decoration many hundreds of years; and there exist numberless examples of the most beautiful and magnificent kinds. Those who would see what wall surface might be, when treated in this manner, are referred to Jerome's picture in the loan collection of the art gallery, "The Snake Charmers," for the special observation of the wall behind the seated figures. In the Arabian house in Cairo Street, in the Midway, there is a most fascinating piece of work in the alcove in the western room, and the Damascene house, also on the Plaisance, affords other examples, all illustrating ancient work. In Oriental countries tiles were used in the most magnificent way throughout the Middle Ages, especially in Damascus, Cairo, Moorish Spain, and the chief towns of Persia; and in Spain proper, tiles of a coarse kind of majolica were used during the sixteenth and seventeenth centuries, some examples, supposedly the work of Italians settled in Spain, still existing in Seville. In Spain we also find the wall tiles of the Alhambra, which are the most beautiful productions existing of Hispano-Moorish work, and some resemble majolica ware in technique, but the finest are designs taken from mosaic patterns of complicated geometrical interlacings. During the period comprised in the twelfth to the sixteenth centuries, floor tiles were used in Northern Europe. Majolica tiles, rich in color and pattern, were used in the fifteenth and sixteenth centuries in Italy as pavements, few now remaining on account of the softness of the material, though one very fine piece of work is still to be seen in one of the chapels of S. Maria del Populo in Rome, dating from 1480. Their introduction into England occurred during the sixteenth century, the importation being from Spain.

EXAMPLE OF ARABIAN TILE WORK.
REPRODUCTION OF A PAGE IN "L'ART ARABE," BY PRISSE D'AVENNES.

This brief summary shows that the manufacture was continuous, and if their artistic perfection at the present day only equalled their mechanical state, we could also say it was progressive. But there one pauses, for, much as one wishes it were so, a comparison of the illustrations of "L'Art Arabe" of Prisse D'Avennes (using his book as an example of many) and the modern tile catalogue shows that, even allowing for the difference in national tastes, the magnificent and truly beautiful designs which Mons. D'Avennes has gathered together are far superior to those offered for our selection by the mural decorators of to-day. Undoubtedly the religious command forbidding Mohammedans to depict living things was a great factor in this result in limiting to a confined field of decoration the artistic power which might otherwise have devoted itself to the production of a pictorial art similar to that of other countries. But even if the great artists of to-day are engaged in other things than the beautiful decoration, to which a less liberal code of ethics confined their brothers of the East, we have still the productions of these latter as an example, — beautiful designs of interlaced forms and lines of color, falling in soft brilliancy of glorious mesh over backgrounds of creamy white or yellow.

Their color is magnificent without crudeness, the design never errs in the direction of the too great "pictorialness" of the tiles of this year of grace, many of which have the carved ornament of stone and wood transferred to them in colors, and sin generally in utter violation of all appropriateness of application and of the agreement that should exist between design and material.

To this general reproach there are, happily, exceptions to which one may turn in hope for the future of this beautiful art, and chief among these (since the demand for pictorial effect seems to be irresistible) is what is known as the dry impasto process, which produces a tile of beautiful depth of color, and a freedom from glaze, permitting the representation of single objects of interest without the multitudinous and confusing high lights arising from surface reflection, a fact which, while not interfering with the effect of an all-over pattern, is fatal to the appearance of any single figure. Messrs. Doulton's particular example of this new departure is part of the decoration of a church wall, and represents a descending angel in an attitude of prayer, robed in bluey greens, with purple-shaded wings. The whole thing has considerable depth and richness of color and a g r a t e f u l softness after the hard, cold appearance of similar subjects on glazed tiles. This process also permits of the use of a larger sized tile, which is an improvement, inasmuch as it gives more the true wall-surface appearance. The background to the angel is a pale yellow with a conventional design in darker tints, which is very pretty; and some parts of the robes are wonderful in the effect of texture.

EXAMPLE OF ARABIAN TILE WORK.
Reproduced from a Page in "L'Art Arabe," by Prisse D'Avennes.

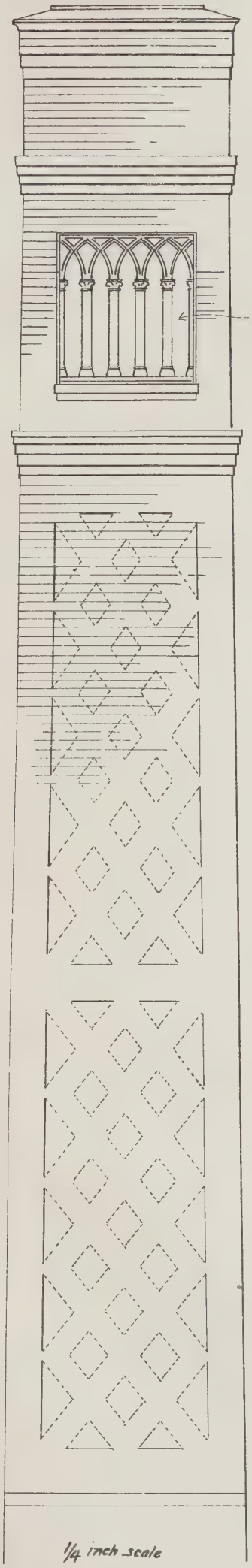
The lack of glaze does not negative the washable properties always associated with tile, so that this gain of a material better suited for decoration in accordance with the current demand is a most valuable one and will do much to relieve the incompatibility existing heretofore between subject and material. This subject of tile pictures is a very difficult one to treat in a condemnatory way, still more so when the taste for them has resulted in the production of a very beautiful substance, eminently suited for mural decoration, and rendering almost imperishable any frescos its surface may be adorned with. But the more widespread uses of tiles seem to have been neglected and their proper decoration, with a view to their greater domestic use, forgotten in other pursuits. Their extensive and triumphant use, however, in clubs and hotels, seems to be paving the way for the tile wall in the house, hitherto confined to the bathroom and kitchen, where its utilitarian qualities were more considered than its artistic merits; and we shall all probably welcome the day when paper and wood shall give way to the cleaner and more enduring clay. And as much as it is more enduring, so must it be more beautiful, and beautiful with a beauty founded on truth, and higher than passing fads. The field of their future usefulness is wide, and, seeing their probable position in the home, the question of beauty is paramount.

We have evidently strayed from the track: it is easy to start afresh, and, instead of surfaces that jar one to the soul, let us have walls beautiful for all time and all men. We must now aim at refinement rather than magnificence, and must also get rid of the idea that the combination of many pieces of clay, of various colors and various geometrical shapes, can constitute a decoration fit either for wall or floor; especially not for floors, where the area of resistance afforded by the cement should be as great as possible in proportion to the area sustaining the loosening blow of the heel. To this use of small pieces where large were required may be traced the character of easily getting loose now possessed by tile pavements, and also partly their abandonment in favor of marble tiles, which latter, on account of their size, have an area embedded in cement which is too large to be affected by the tread of feet.

M. Emile Muller has shown us the palace wall of the past; Messrs. Doulton, the church wall of the future. Who will show us the coming domestic wall, the ideal, clean, lasting, unaffected by damp, impervious to sound, beautiful in make, and susceptible of infinite variety in color and appearance?

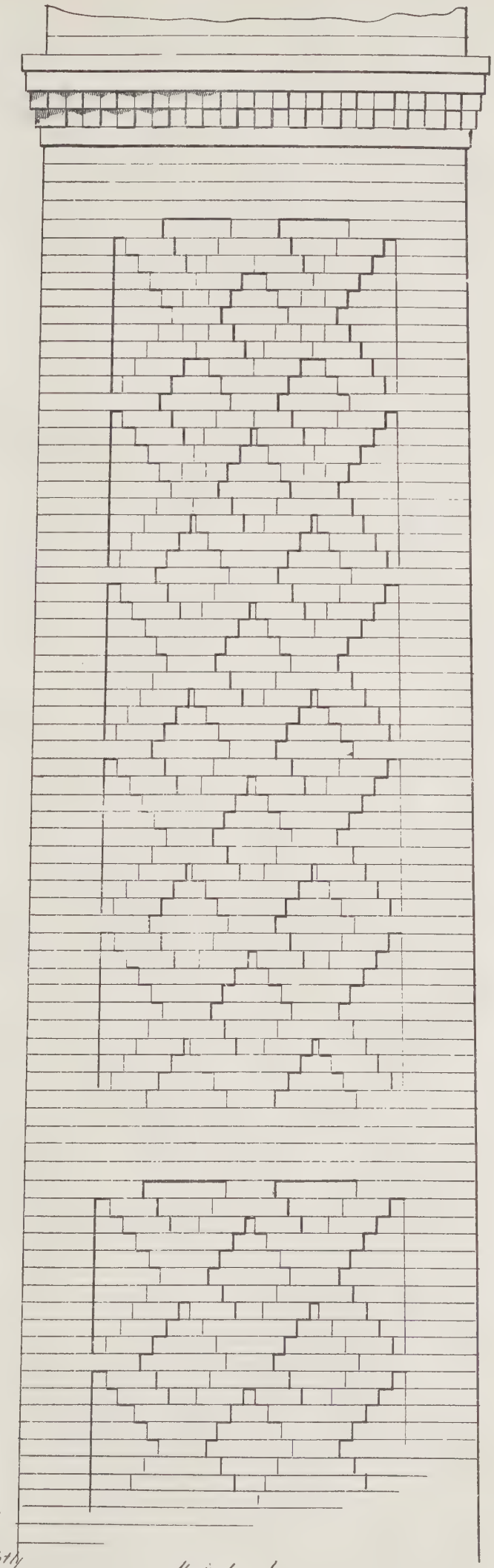
George M. R. Twose, Chicago.

Attention is called to our advertisement for correspondents in every city and town in the United States. An intelligent, enterprising young man can make a good thing in this position.



1/4 inch scale

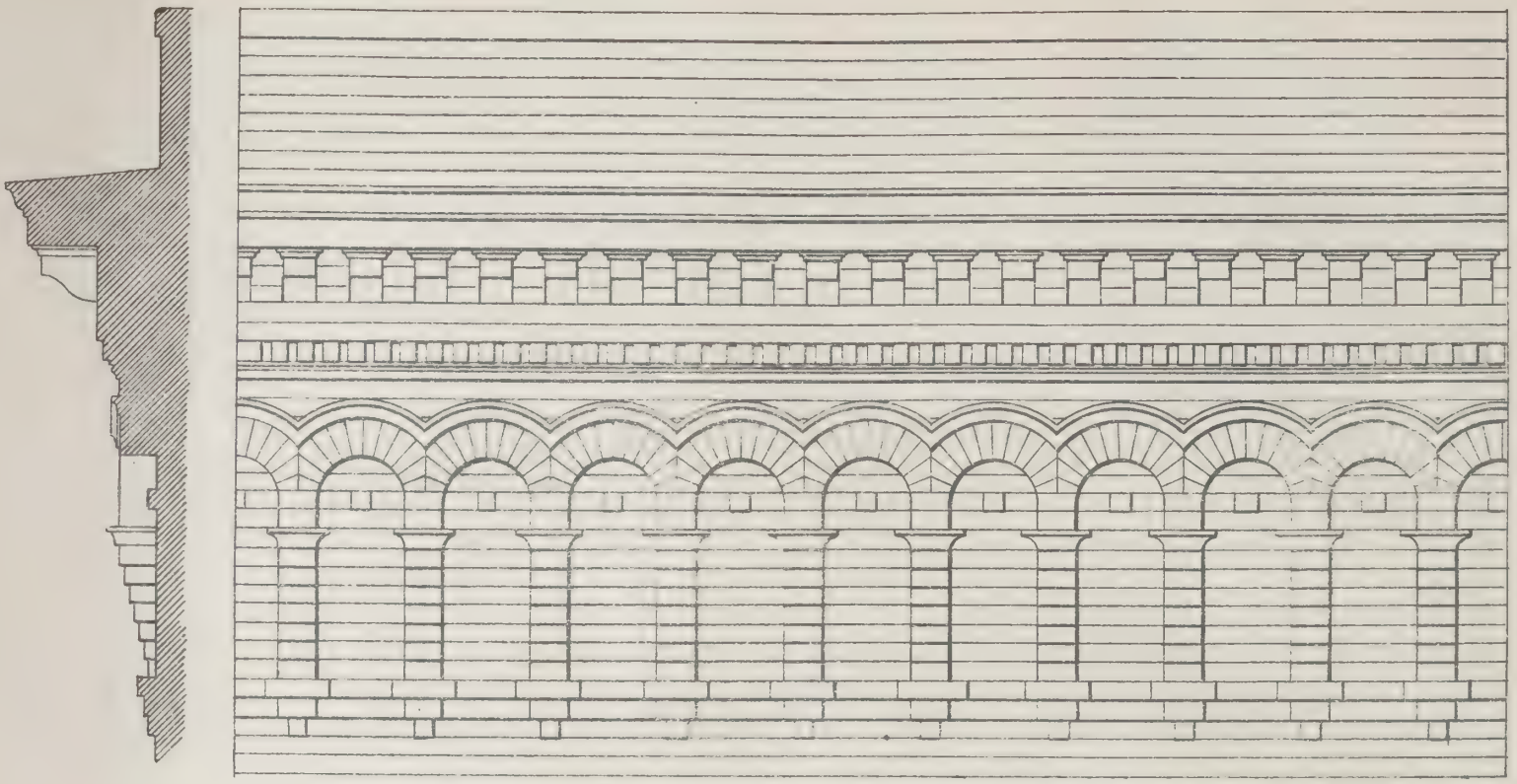
Note: The diaper is made of stretchers, the depth of the reveals increasing slightly towards the top. The reproduction is to the scales marked.



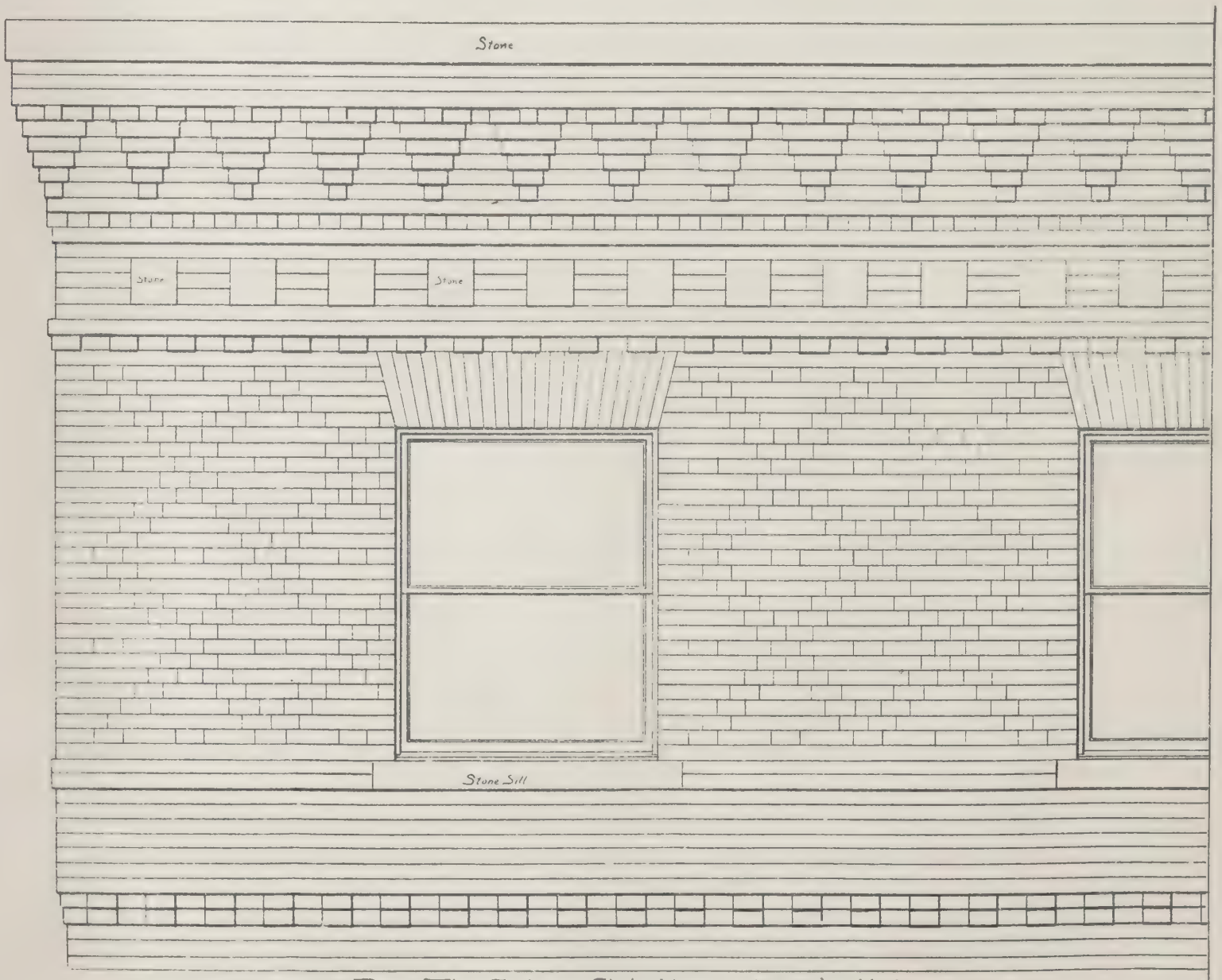
1/2 inch scale.

ELEVATION AND DETAIL OF CHIMNEY FOR BOILER HOUSE, BROWN UNIVERSITY.

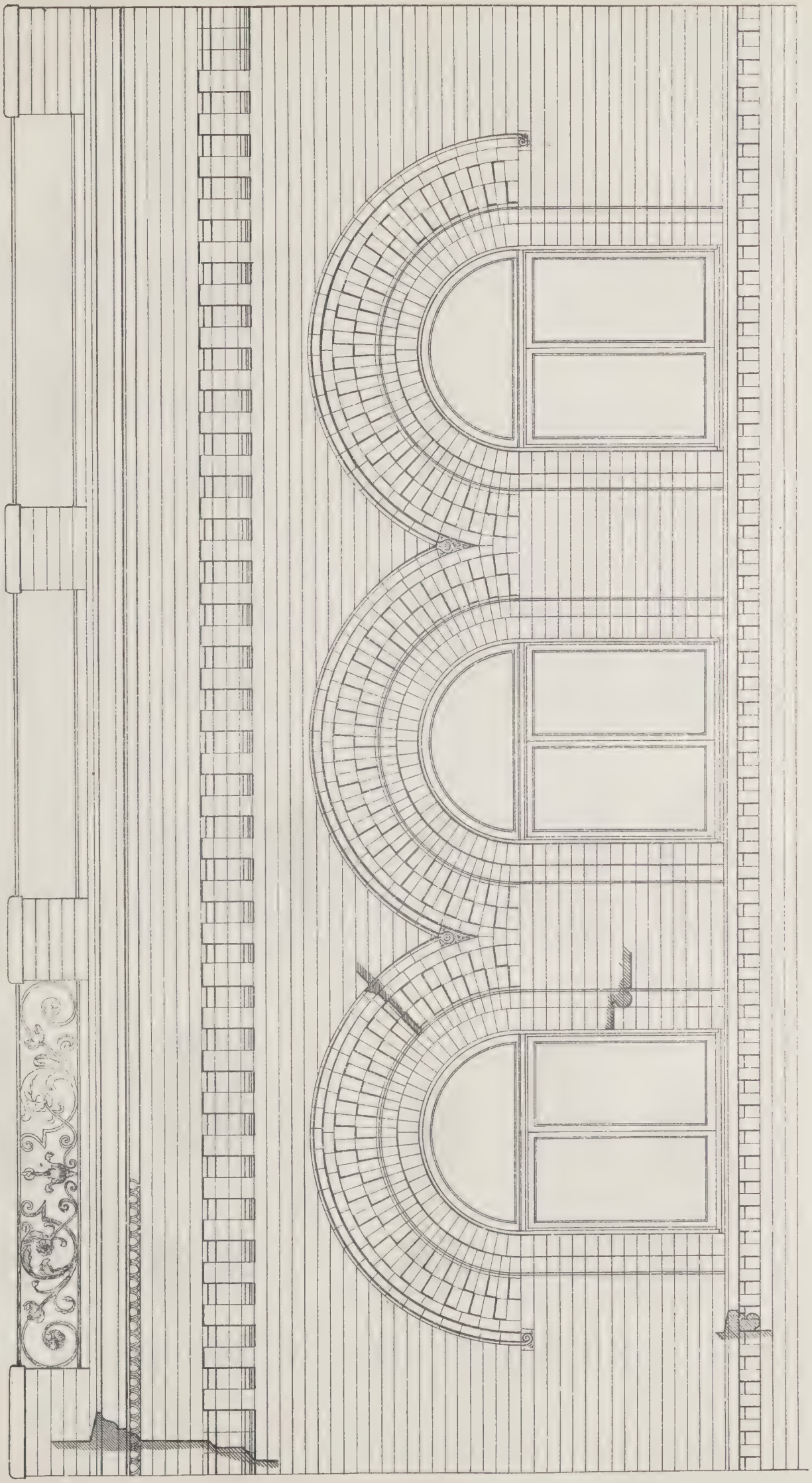
GOULD & ANGELL, ARCHITECTS, PROVIDENCE, R. I.



From The Cobden Apartment House, Chicago.
Charles S. Frost, Architect.



From The Saturn Club House, Buffalo, N.Y.
Fleming & Burdett Architects.



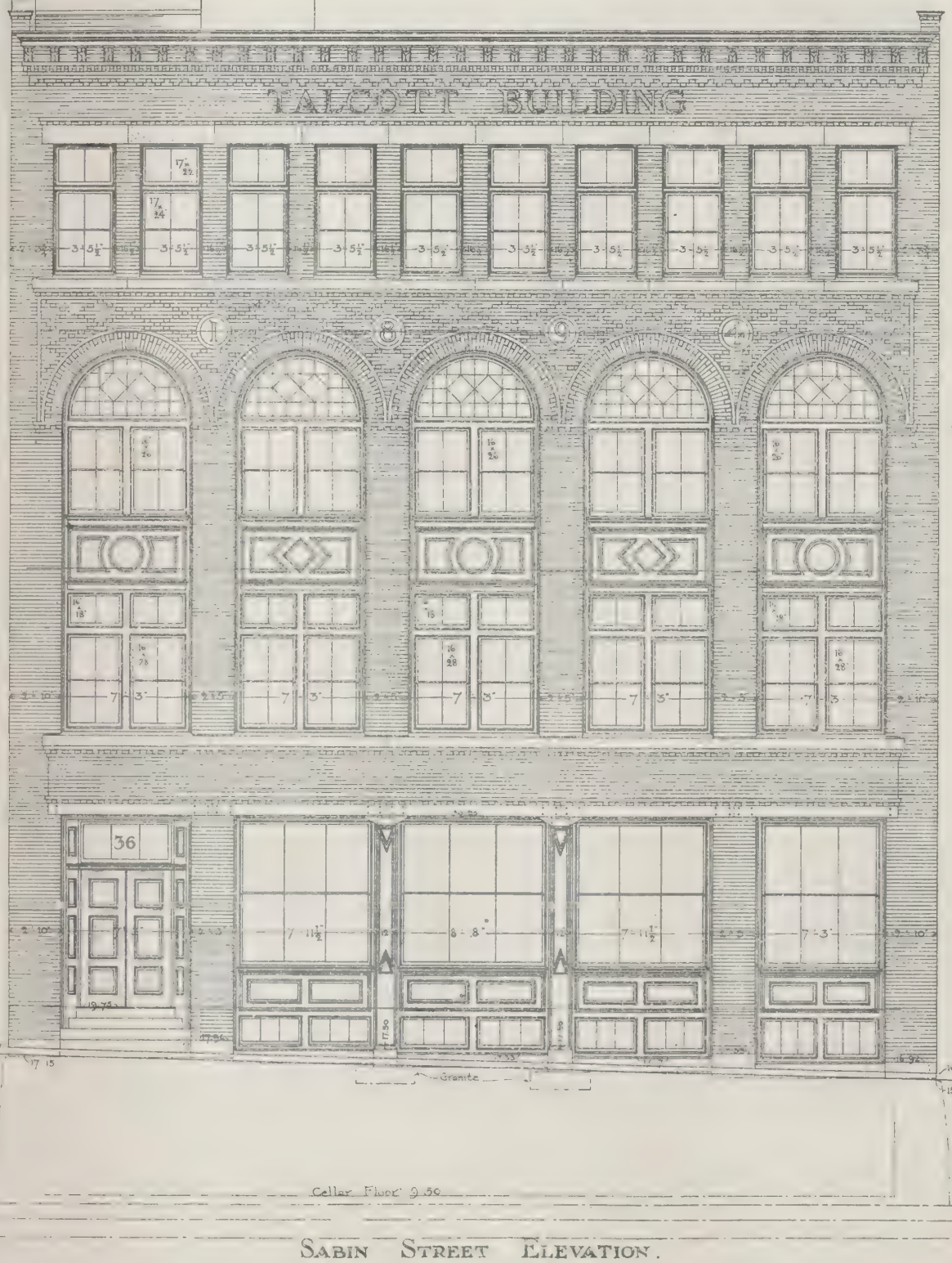
SUGGESTION FOR THE UPPER STORY OF A 25-FOOT CITY HOUSE.

THE "DETROIT CLUB" DETROIT, MICH.

FRONT ELEVATION

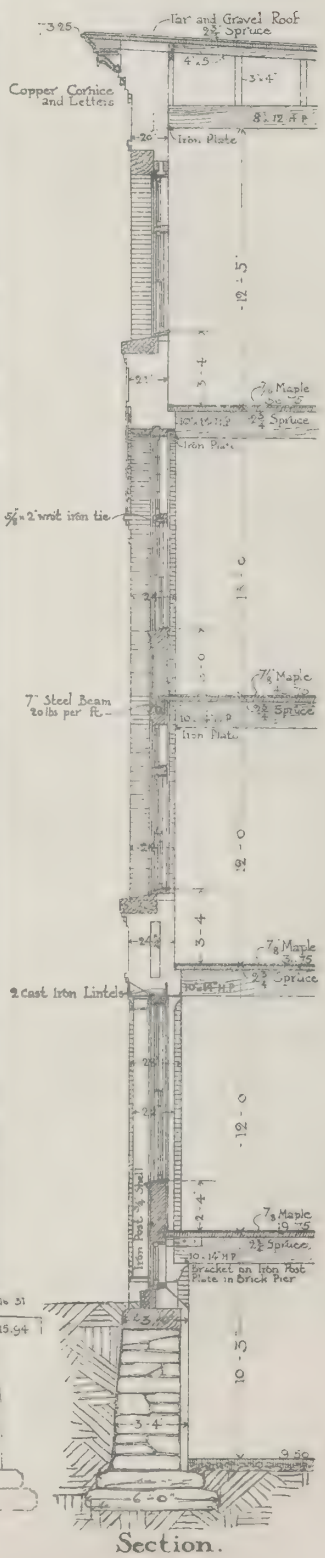
WILSON EYRE JR. Phila.
JOHN SCOTT and CO. Detroit
JOINT ARCHITECTS

PLANS OF A MANUFACTURING BUILDING AT PROVIDENCE, R.I. FOR FRED TALCOTT, ESQ. STONE, CARPENTER AND WILLSON, ARCHITECTS. 75 WESTMINSTER ST., PROVIDENCE, R.I.



SABIN STREET ELEVATION.

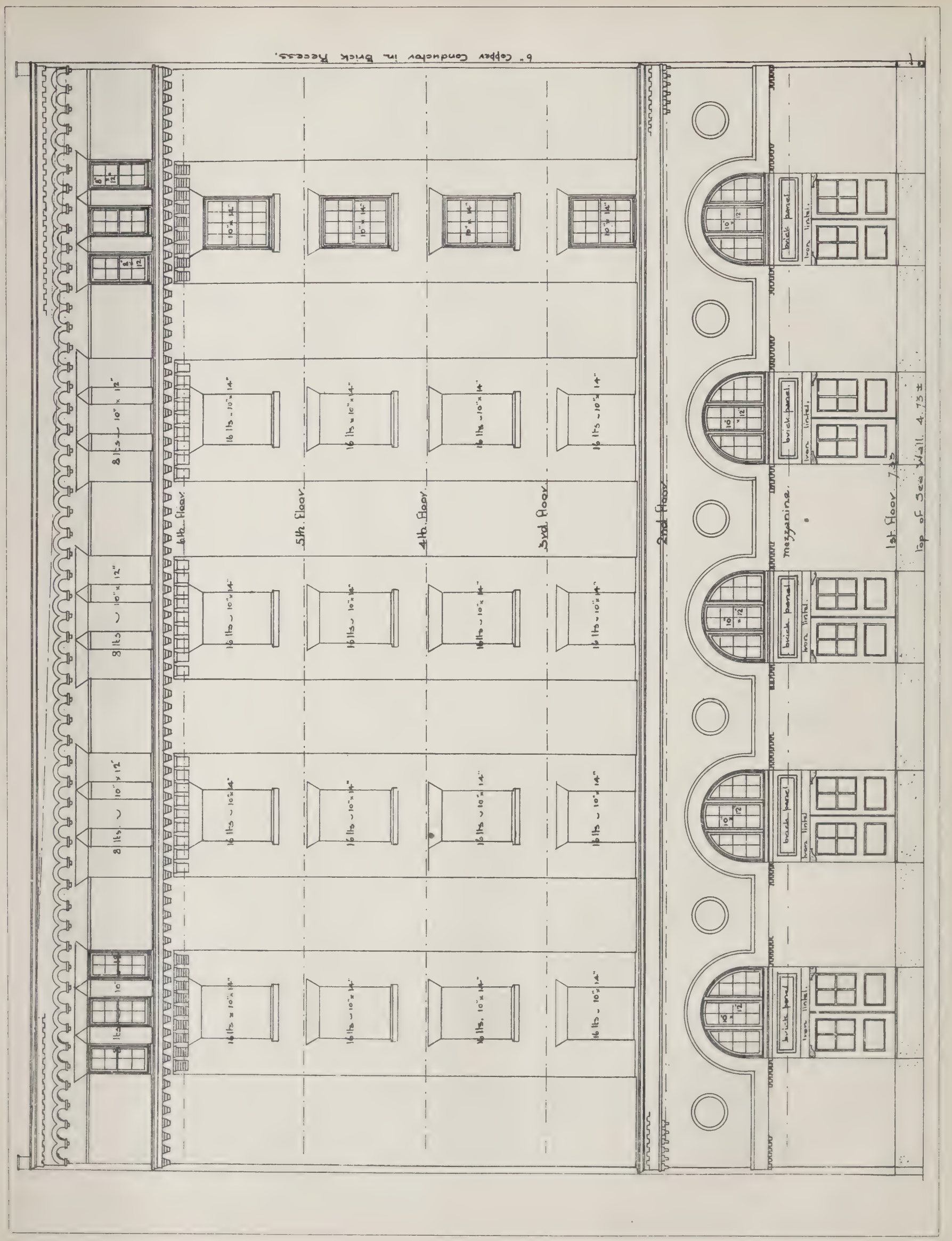
Scale ¼ inch = 1 foot.



Section.

WAREHOUSE ON DYER STREET, PROVIDENCE, R. I., FOR DAY SONS & CO. (REPRODUCTION ONE-EIGHTH INCH SCALE.)

STONE, CARPENTER & WILLSON, ARCHITECTS, PROVIDENCE, R. I.



WAREHOUSE FOR DAY SONS & CO., PROVIDENCE, R. I. ELEVATION ON WATER FRONT.
(REPRODUCTION ONE-EIGHTH INCH SCALE.)

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

PUBLISHED BY

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IN spite of the objections of "practical men," there is crying need of some good course of technical study to fit men for the carrying on of the clay-working business. Such a course should be pursued with special view to the work for which it is a preparation; but, after all, it is in the teaching of scientific methods that such a course is valuable. Let these "practical men" analyze their own progress before condemning technical education. We would ask them if their work has not been characterized by scientific methods. Have they not gained their knowledge by the collection of data from experience, by sorting out and classifying, perhaps unconsciously reaching by slower and more uncertain processes the results that the men trained in scientific methods would arrive at? A course at a good technical college teaches the student, first of all, order and method; nearly as important as these, and really inseparable from these, is exactness. In his laboratory work, be it in the chemical, the physical, or engineering departments, he is taught to observe, to make notes of his observations, to apply his previous knowledge to these observations, arranging and classifying them so that he may refer back to them for comparison with similarly arranged data secured from subsequent experiments. With some experience he is enabled to reason from former results what the results from new experiments should be. If these results do not verify his reasoning, if something unexpected turns up, his reasoning is either at fault or he has neglected to take into consideration some factor that has caused the variation. To ascertain this factor is his first operation.

A man with a fairly good head can, if he is earnest in his work, drill himself most thoroughly in scientific methods in a four years' course; and if he works with his future occupation in view he will be splendidly equipped for his business, upon leaving college. A few years as assistant superintendent where he can observe the application, on a large scale, of processes he thoroughly understands in theory, will place him in a position to carry on his work with comparatively little loss from the failure of processes. With such a man the element of chance or good luck is unknown. For every effect he knows there *must* be a good cause. Is there any question which is the better method, — to blunder along, gaining knowledge by costly experience, or to devote several years to training the mind to work with method, with accuracy, and with certainty? In dollars and cents, the latter method would show a great balance to its credit.

In the manufacturing of iron and steel, paper, textile fabrics, in railroad management, in electrical works, bridge works, water supply and sewerage systems, and the many pursuits demanding scientific knowledge, we find these graduates of technical colleges, these "theoretical young gentlemen," at the very head of the practical work. There is nothing about the clay-working industries that places them beyond the comprehension of scientifically educated men.

There is no necessity of establishing a clay-working college. Any of the technical schools which have been successful in preparing men for other manufacturing businesses could arrange special courses combining geology, chemistry, mechanical engineering, and a little of physics, which could be followed to advantage in preparing for the clay-working business. There is, we believe, enough field among the larger clay-working plants to warrant young men in such schools as the Massachusetts Institute of Technology in pursuing special studies as we have indicated. There is no doubt in our mind that they would speedily find positions where they could soon demonstrate their usefulness.

THE enormous loss from fire, during the last ten years calls for the enactment of rigorous building laws by every city and town of importance. In almost every instance the fire has spread with such great rapidity that when the firemen reached the building their work seemed to produce no effect whatever. In the case of a fierce fire the firemen can seldom get close enough to the building to make their streams effective. Thrown from a distance, these streams spread into spray by the time they reach the blaze and they are at once converted into steam. This condition of affairs must threaten us so long as the majority of existing buildings offer every opportunity for the rapid spread of fire. A fireproof building erected in the midst of such buildings may stand through a conflagration raging on all sides, but its interior finish and its contents would be ruined. So far as fire within is concerned it is safe; but, if unprotected from a fire next door or across the street, it is an improvement only in one way: it will not allow a fire within it to spread, and it will not add to the fury of a fire. There can no longer be any question as to the absolute success of the fireproof system of construction when correctly carried out. It is an improvement upon methods of construction in Germany and France. The operations of a fire department in Berlin, moving with military formality, or the "garden engine" department of Paris, would be positively

ridiculous in our American cities. But were our construction as carefully guarded by building laws as that of Paris or Berlin, and if our existing buildings were not a standing menace, our present expensive fire departments would have no *raison d'être*.

While there are many patent fireproof materials in the market, the products of clay, tested by centuries, stand far in the lead. We know they are fireproof and we know they are enduring, a fact that the present generation will never know of most patented materials. This is a point to bear in mind. Architects are no longer erecting important buildings for a short life. Those buildings are expected to stand without great expense for repairs for generations. There are no materials save those of clay that practically answer all requirements.

IT is a curious fact that comparatively few architects understand that architectural faience is merely glazed or enamelled terra-cotta — that it can be made in any form that terra-cotta can be made in, and the coloring is at the command of the architect. This misunderstanding has made it a bugbear in the minds of many who regard it as some mysterious and experimental material that conservative practitioners had best steer clear of. This belief is so prevalent that a certain firm of manufacturers have decided hereafter to refer to it in their printed matter as "glazed or enamelled terra-cotta," rather than stick to the first adopted and more proper name of "faience."

AN important change in Eastern terra-cotta interests has been made by the combination of Messrs. Stephens, Armstrong & Conkling of Philadelphia, the Boston Terra-Cotta Company, and the New York Architectural Terra-Cotta Company, under the latter company. Messrs. Stephens, Armstrong & Conkling will continue as a Philadelphia branch of the New York company. The Boston Terra-Cotta works will be closed, the managers, Messrs. Fiske, Homes & Co., acting as New England agents for the New York company. This change will not affect the Fiske, Homes & Co. works in South Boston, where the manufacture of architectural faience and fire-flashed and Pompeiian terra-cotta will be continued. This arrangement will, of course, cut down the number of competitors for terra-cotta work in the Eastern section of the country to two large concerns, the New York and the Perth Amboy companies. We are inclined to believe that this change will help the smaller companies rather than injure them, and it will certainly simplify matters so far as the architects are concerned.

FROM the natural course of things, railroads are the principal factors in developing the natural resources of the territory through which they pass, and doubtless many railroad men consider their work in this development finished when they have placed transportation facilities at the command of the people in this territory. But there are other roads that realize the vast advantages resulting from the establishment of industries along their lines, and many of these have large industrial departments collecting and spreading information, offering inducements to manufacturers, and bringing new capital into the cities and towns on their lines. The Illinois Central is one of the most progressive of such roads, and Mr. George C. Power, the Industrial Commissioner of this road, has issued a very valuable and exceedingly well-arranged book, entitled "One Hundred Cities and Towns Wanting Industries"; these of course being located on the Illinois Central system.

In going over this book we find that thirty-nine out of the one hundred offer inducements in the way of clay, among other raw materials. Of these, twelve are in Illinois, twelve in Iowa, two in Kentucky, two in Louisiana, nine in Mississippi, one in Tennessee, and one in Wisconsin.

Of the towns especially desiring clay-working plants there are nineteen. Cedar Rapids and Osage, Ia., Amite, La., Clarksdale, McComb City, and Senatobia, Miss., want building-brick plants. Anna and Paxton, Ill., want general clay-working industries; Bloomington and Springfield, Ill., Sioux City, Ia., Baton Rouge, La., Holly Springs and Natchez, Miss., want paving-brick plants.

La Salle, Ill., already noted for a large, fine pressed-brick plant, is looking for building brick, paving brick, and general clay-working industries. It is a city of ten thousand population, has four lines of railroad, a large bank, waterworks, gas and electricity, and electric street cars. It is on the Illinois River, at the head of navigation and at the terminus of the Illinois & Michigan canal, and has available raw material in the way of fire clay, cement rock (suitable for the manufacture of Portland cement), coal, fine brick clay, common brick clay, and shale. It is only one hundred miles from Chicago.

Memphis, Tenn., Water Valley and Oxford, Miss., offer inducements for both building and paving brick plants. Water Valley is in the central part of Northern Mississippi. It has a population of 4,500, and modern improvements. For raw materials it offers manufacturers an abundance of brick clay, fine clay for earthenware, tiling, and fire brick. There is no brick plant within one hundred miles of this city.

Wickliffe, Ky., has an abundance of potters' clay, a splendid quality of clay for fire brick, and good clay for any of the higher grade of manufactures. Industries of this sort are especially desired. The town has a population of 1,100, is situated on high land on the Mississippi, three miles below the mouth of the Ohio, so that, with the Illinois Central and Mobile & Ohio Railroads, and the steamboat lines of both rivers, it has admirable transportation facilities.

The little book we have taken these points from should be consulted by every manufacturer considering a change of location. Complete information on any particular point will be readily supplied upon application to Mr. George C. Power, at the Chicago offices of the Illinois Central.

THE BRICKBUILDER

VOL. II. BOSTON, OCTOBER, 1893. No. 10.

BRICK ARCHITECTURE IN NEW YORK.

IF New York has an agreeable architecture in brick, we need not wonder when we recall that it is the heir to all the traditions of its Dutch founders, themselves past masters in the use of this material, as the streets of Amsterdam, Rotterdam, Leyden, and other Dutch towns attest; yet there has been a long, long interval between that good old work and the recent work that we call good. This is through no fault of the old, however, which, owing to its sturdy construction of hard brick and harder mortar, would probably have remained intact till the present day along the streets of the colonial town, had it not been destroyed by the march of the city upon it. It was a fine object-lesson, a few years ago, when the walls of an old building, preserved by some chance from the devastating speculator, were finally doomed to destruction; the brickwork was broken up by blasting, the bricks themselves breaking rather than the mortar of the joints. In many of the older parts of the city, — Greenwich town and the purlieus of Bleecker and Amity Streets, and a dozen other quarters, formerly occupied by the "first families," — one meets with rows of modest and sedate brick fronts, with sloping slated roofs, classic wooden entablatures, — white and colonial, — the doorways plain arches with keystones, framing a classic motive in wood, the windows without mouldings and covered by flat arches of gauged bricks; the whole forming a composition oft repeated, but never becoming tiresome, because so simple and unpretentious. After one has adventured himself in the new districts of the West Side nothing restores his equanimity better than a stroll in quiet Greenwich.

Of the middle period, after the older houses and churches had long been passing to a gentle decay, one notices the church on 4th Avenue and 20th Street (Dr. Bellows's), a combination of red brick and light stone in horizontal courses, suggesting its familiar title of the "beefsteak church."

Another example is the church on Madison Avenue at 42d Street, a fine production in its time, and even now of interest, with its open tower and ornamental pattern work in brick. The so-called "Brick Church" on 5th Avenue is an interesting specimen, although its characteristic quality is due entirely to the stone used. Most satisfactory of all, perhaps, is the small old church on 5th Avenue and 125th Street, like Dr. Bellows's church, Italian Romanesque in style, of singular beauty in composition and detail, upon whose walls one regrets to see the ivy climbing, as no part of it needs to be hidden. This phase is further represented by several churches, simple and dignified in style, designed with little effort after effect, all in red face brick, with round arches and square reveals, in no particular style, but possessing a certain feeling and interest which many of the more labored compositions lack. With them should be classed the New York College on 23d Street and the Normal College on 68th Street, both Gothic in style, the latter building quite beautiful under its ivy. Space would fail to describe the "Little Church around the Corner," — a rambling low Gothic building, — or the innumerable small houses and stables met in the most unexpected quarters; in fact, one often questions whether the unstudied effects of back-yard architecture do not, on the whole, exceed in interest, as they certainly do in a quality much striven for, those of the street fronts. Especially is this true on the East Side, north and south of Grand Street, where the new work is of value only in showing the inscrutable vagaries of the untrained mind. Adjoining a seven or eight story flat house in yellow brick and brown terra-cotta, with medallions, "life-size" griffins, consoles, broken pediments, and all the stock patterns of the terra-cotta catalogues, will often be a forlorn and dirty, but eminently respectable house, sober and dignified beside the architectural "orgy" next door. As an example of this old-time respectability outlasting its generation, some will recall a fine gambrel-roofed house on the river a little below Grand Street, on which the weather-beaten sign, "Ferny House," may still be read.

After the old patterns of angular moulded bricks and ugly, meaningless terra-cotta "ornaments" had yielded their full crop of unhappy combinations, the era of better

things appeared with a certain warehouse on Duane Street, and the De Vinne Press on Lafayette Place, both in common red brick with sparing use of terra-cotta. The interesting front of No. 55 Broadway, built in 1881 or 1882, is also of red brick assisted with brown stone and terra-cotta. The same skilful designer has given us a warehouse on Center Street, and a private house on West End Avenue and 76th Street, all marked with such individuality that when the other men copy them, as they do frankly, one thinks of the designer of the originals, and not of the several architects.

For warehouses, brick easily holds its own against all comers, nor is it considered necessary to add stone or terra-cotta, as the very successful building on the corner of Hudson and Harrison Streets, and as several recent warehouses in the vicinity of the bridge entrance, prove. The Manhattan Storage Warehouse on 42d Street, another on 57th Street, and the Eighth Regiment armories are good examples of the use of red brick unadorned, while those of the Seventh and Twelfth Regiments are striking illustrations of different ways of employing stone for enhancing the effect of a composition in brick.

Thus far red bricks have served the purpose, but with the increased production of colored bricks the old shades of red are more sparingly used, although three notable groups of buildings have contented themselves with red bricks, contrasted with red sandstone trimmings,—the Union Theological Seminary, Columbia College, and the General Theological Seminary. Of the two latter buildings the interiors are entirely of brick, for the most part in light shades, with occasional bands of red. The library of Columbia College and the chapel of the General Theological Seminary are of exceptional interest, as showing the capabilities of brick for interior work combined with wood or iron.

The Produce Exchange in red brick and terra-cotta, the Cotton Exchange in yellow, and the Havemeyer Building in gray, form an instructive series, as coming from one hand, the use of gray bricks for business houses being a recent innovation.

Some office buildings have been built in rock-faced brick, fortunately away from the main line of travel for the most part, being, as it is, "a thing that will do to try once."

On the west side, above 72d Street, a very large number of houses and apartments has been built within a few years, and the greater part are in bright-colored brick,—red, salmon, gray, mottled, yellow, and white, of every shade that can be devised. Most of the churches are of stone, but a remarkable exception is seen in the Collegiate Reformed Protestant Dutch Church, on West End Avenue, built of yellowish brick and a peculiar shade of yellow terra-cotta, forming a combination of colors attractive enough on a first visit, but which must be very trying to the neighbors who are obliged to see it daily. The West End Presbyterian Church in Harlem, in light-yellow brick, with a high square tower, and a chapel adjoining it, is a fairly successful combination of colors. The houses in this district are for the most part speculative, if one may judge from their appearance: they are made like advertisements, calculated to catch the unwary, determined not to let him escape if it can be prevented; their loudness overpowers the din of the city, while every device of architecture and building is tried again and again, each house striving to exhaust the subject, and leave nothing for the next comer. The visitor hastens from the neighborhood jaded and exhausted after attempting to discover examples of the ideas of composition and proportion, which are supposed to contribute to real architecture. However, the materials are often good: the varied colors of the bricks and terra-cotta used show the resources of the clay beds, and the skill which our friends the brickmen are acquiring of combining the clays in beautiful and delicate tints. When the brick and terra-cotta are used seriously, as in some charming Dutch houses on West End Avenue, the results make one long for more of such work. This is the case in the so-called King model houses in Harlem, where three rows of dwellings, each row a block long, in one color of brick, are built along the streets, the blocks being intersected east and west, and north and south, by alleys with cement pavements. All of the houses in each block are substantially alike, and the effect of these monochrome façades of about eight hundred feet is remarkable; but one wonders why a little more variety was not obtained by alternating the three colors upon the same block, the two cross-alleys affording a sufficient motive for changing the color scheme.

Among a great many buildings of the first-class, one would select as pre-eminent the Century Club, with its very delicate straw-colored brick and white terra-cotta on a white-marble basement; the Hotel Renaissance opposite it, the Hotel Imperial, the Yosemite Apartment House, and the Colonial Club, all in yellow and white, with the Madison Square Garden, showing rich and fine detail contrasted with long wall surfaces of yellow brick, unculled, giving a most excellent effect without any assistance of ornament other than string courses and arch mouldings over the windows. The surfaces of the high, square tower have a slightly raised-brick pattern, which the sun picks out in faint shadows with good effect.

The Tiffany House on 72d Street demonstrated the ability of a dark mottled brick to make large wall surfaces interesting, the experiment being successfully repeated in the Freumdshaft Club, and again, with variations, in the house of Mr. J. Hampden Robb, on Park Avenue. The Goelet Building shows the most delicate coloring, and the Railway Men's Reading-Room, on Madison Avenue, another charming effect of highly colored mottled brick.

C. W. S.

THE Kellogg Building, illustrated on the opposite page, and on plates 76 and 77, is of mottled brick and terra-cotta from the Perth Amboy Terra-Cotta Company. The roofing tile was furnished by the Lindemann Company at Baltimore; it is a dark-red, dull glazed finish.

OFFICE BUILDING FOR E. L. KELLOGG & CO., NEW YORK.
WILSON EYRE, JR., ARCHITECT, PHILADELPHIA.

See Plates 76 and 77.

SLIPSHOD WORK OF LONDON BRICKLAYERS.

THE Architectural Association of London recently held a meeting to discuss the education and workmanship of London workmen. The basis of discussion was a paper by Mr. Owen Fleming, which contained these remarks concerning bricklayers: —

"Speaking of the capacity of the average building mechanic in London, I feel I am but the mouthpiece of my professional colleagues when I say that his work is very far below the standard it ought to reach. Let me ask the Operative Bricklayers' representative whether even twenty-five per cent of the men who present themselves on a job are capable of executing a piece of good face-brick work. Even among these comparatively capable men, how many are able or even willing to do a piece of really first-class work without constant supervision? Perpends are not truly kept, the headers are not central over stretchers. The joints are of uneven thickness. Bricks chipped and with angles knocked off are built in without thought. Care is not taken that the best face shows outside. Even with interior work, it is most difficult to get the work done properly. The average bricklayer seems to imagine there is no necessity for the sides of bricks to be covered with mortar. A little scrap of mortar on the front edge and some thrown into the joint from above when the brick is laid, is supposed to be sufficient to make a good joint, and the architect who ventures to ask for this system to be altered does not meet with a cordial reception. I came across a man the other day who had built a wall so carelessly that you could not tell the difference between a heading and a stretching course, and yet even this man was a member of the Operative Bricklayers' Society. . . . There is not even the excuse of great rapidity of work to offer. Work is really done at a much slower rate than it used to be. Several contractors have assured me that the price of labor to-day is forty per cent or fifty per cent higher than it used to be, owing principally to the length of time men take in their work, and I have strong evidence to show that bricklayers are practically compelled not to lay more than an average of four hundred to five hundred bricks per day, whereas ten years ago the average per man was nearer six hundred. A comparison of priced bills of quantities of the present day with those of fifteen years ago is an instructive operation. I am not complaining of this slow progress of work. That, regarded on its merits, may or may not be desirable. I only refer to it to show that men have plenty of time to do their work properly if they can and will.

"Let us consider for a moment the question of apprenticeship. For many years past this has been steadily declining in London, and now it may be said to be practically dead. I am informed by persons whose knowledge of this question is great that the average native London bricklayer begins as an odd boy, becomes a laborer, gets on to some speculating work in the suburbs, picks up some rough notion of bricklaying there, drifts back into the metropolis, and offers himself as a competent bricklayer; and on cross-examining two or three groups of bricklayers I concluded there was much truth in this assertion."

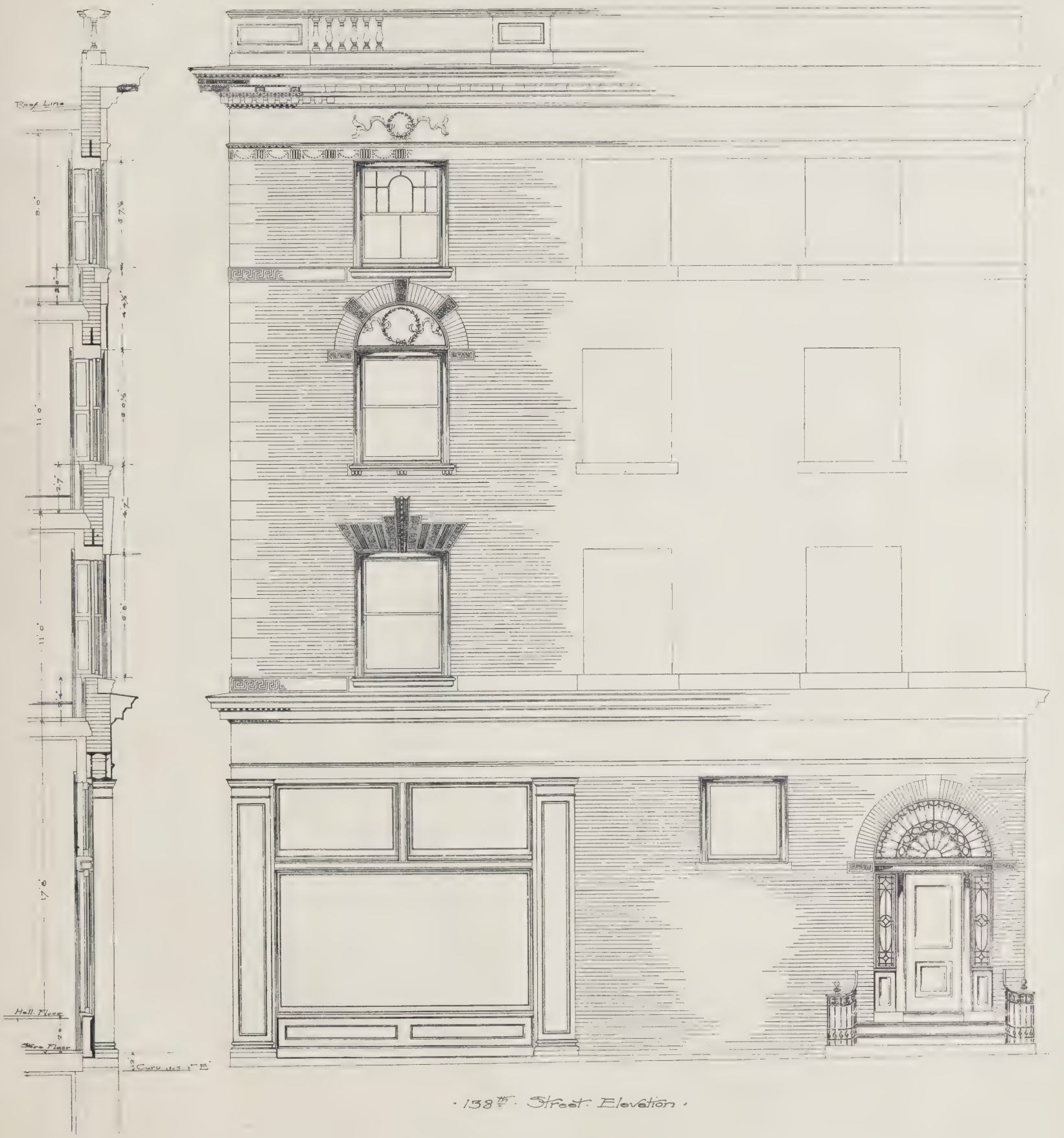
THE IMPORTANCE OF MORTAR COLORS.

FEW architects realize the important place in the color of a brick building that mortar color takes, and it is only when the same bricks are used side by side, with a difference in mortar color only, that this importance becomes fully apparent. There are streets in the newer portions of Boston where the owner of each twenty-foot lot has carried out his own individual ideas regardless of his neighbor, and in one of these streets there are three houses built with exactly the same brick, one with black mortar, one with red to match the brick, and one with white mortar. It is well to remark here that the work was *face*-brick work, very evenly laid with narrow joints. With the liberal joints now coming into vogue, the effect would be more pronounced. Each house, from across the street, seemed to be built of a wholly different color of brick. The red house was the least satisfactory of the three. The house with black mortar color was very effective, and in a country setting this combination could be made very pleasing. Should your brick be a crude red, the use of black mortar color will darken it and tone it down; then by "picking out," with cream or ivory-white, such woodwork as the sashes, or even a porch or veranda, the result is almost sure to be satisfactory. White mortar is also invaluable in toning red brick, when a general light or pinkish effect is desirable. With red brick laid in a liberal amount of white mortar, white trimmings are the safest to use; and many brick houses in the Colonial style, with white porches and white stone or terra-cotta sills and lintels, show how popular this combination is. Such work is very often laid in Flemish bond, and in these cases the headers vary from the same color as the stretchers to a very decided green or blue black.

RED BRICK IN WATER-COLORS.

HOW many of our readers have ever attempted to make a water-color of a red brick building? How many have noticed, in going through exhibitions of architectural drawings, how very rare it is that a really good drawing of such a subject is found, even by the best men? Does a red brick building ever look *red?* Even mortar color to match and sorted red brick cannot produce the color of the sample brick, and yet the large number of renderings are made with the brick to be used, in mind.

If white mortar is used, the effect is anything but red, and yet we have recently seen a water-color, by a man of national reputation as an architectural draughtsman, of a building to be built of hard red brick and white mortar, and the work is now completed. Comparison shows that "he slipped up" that time. This led to looking up a number of similar drawings. Out of some fifteen, only one was found that could be considered successful.



KING MODEL HOUSES, 138TH AND 139TH STREETS, NEW YORK CITY. ELEVATION ON 138TH STREET.

BRUCE PRICE, ARCHITECT, 150 FIFTH AVENUE, NEW YORK.

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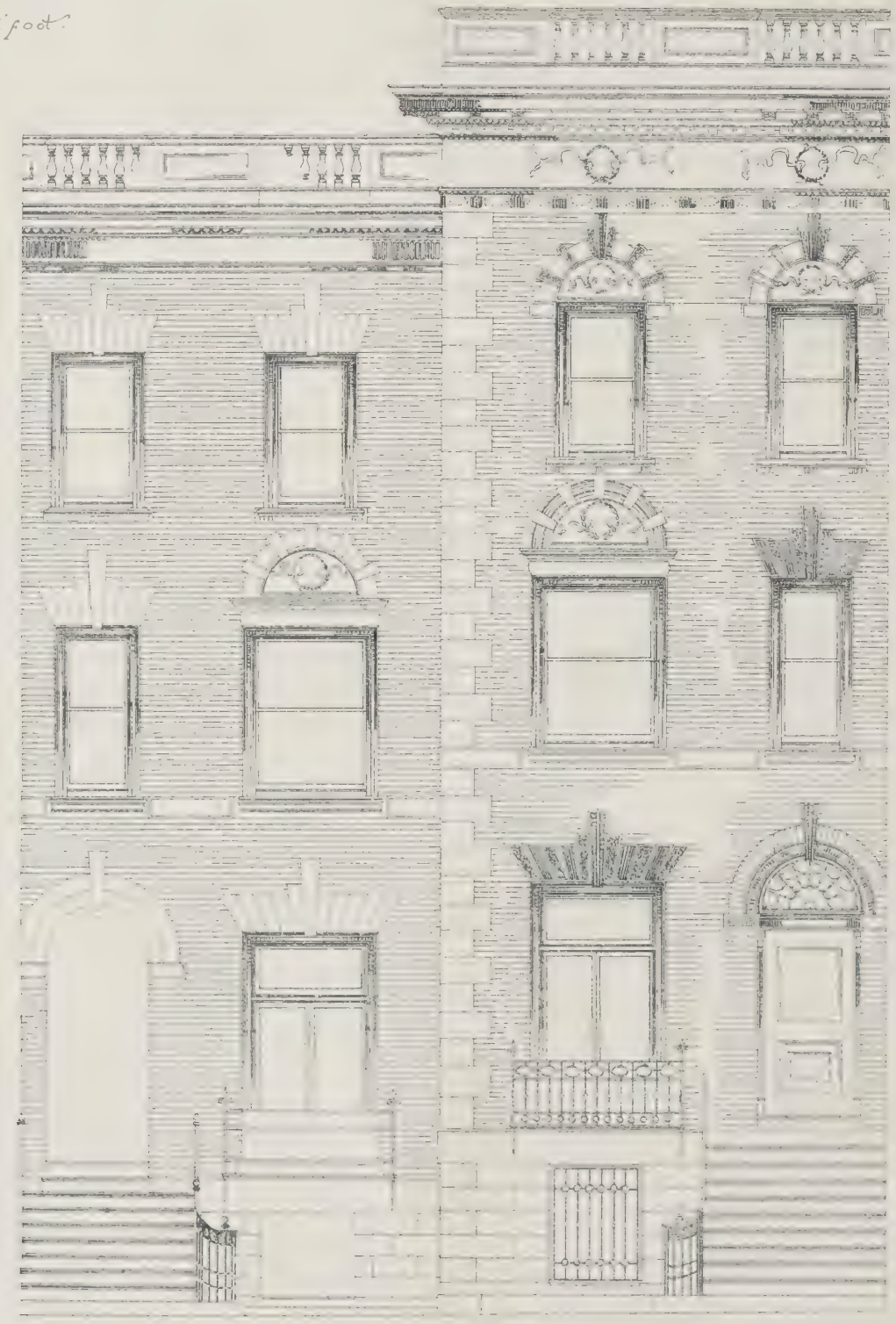
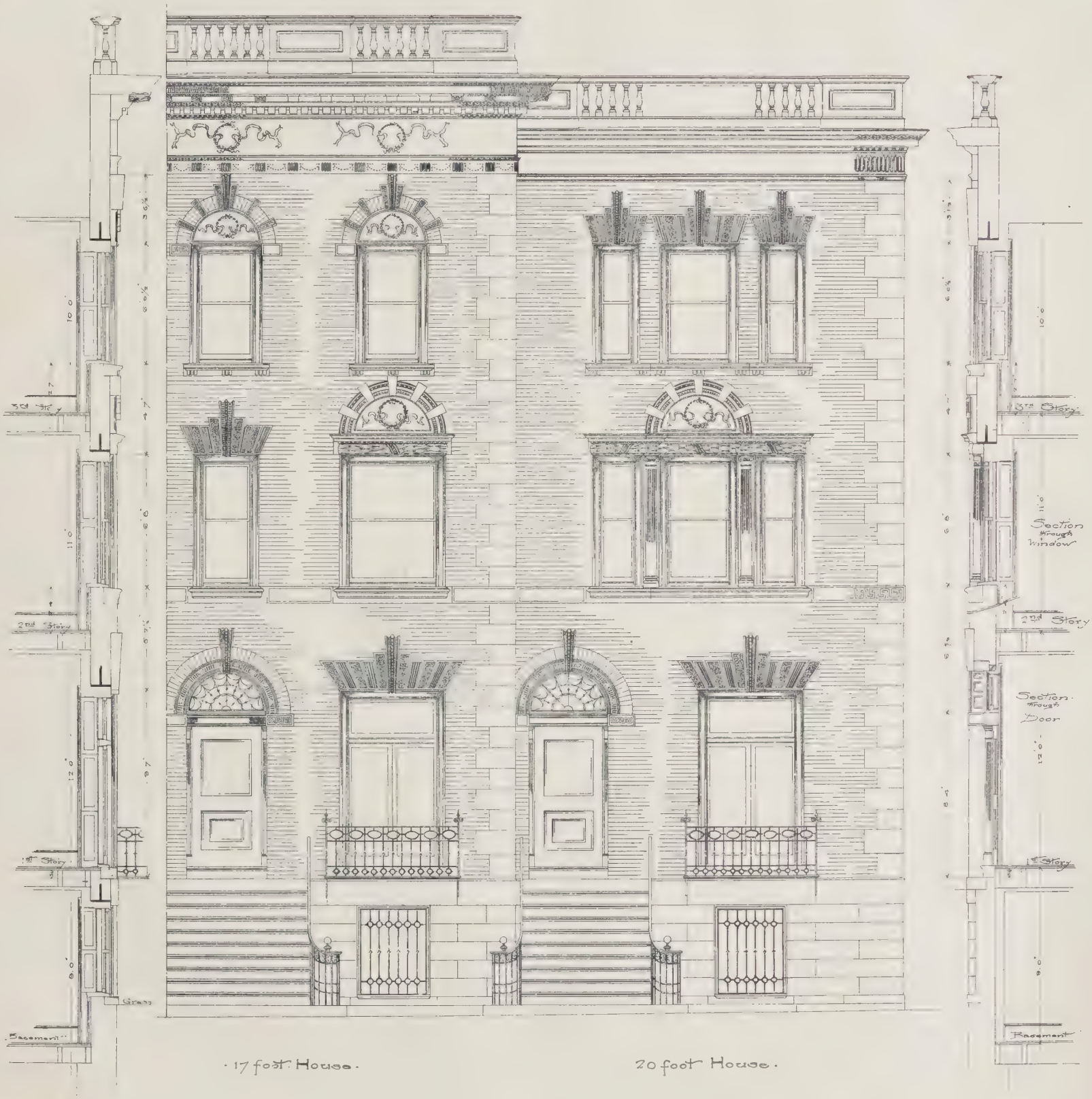


KING MODEL HOUSES, 138TH AND 139TH STREETS, NEW YORK CITY.

BRUCE PRICE, ARCHITECT, 150 FIFTH AVENUE, NEW YORK.



KING MODEL HOUSES, 138TH AND 139TH STREETS, NEW YORK CITY.

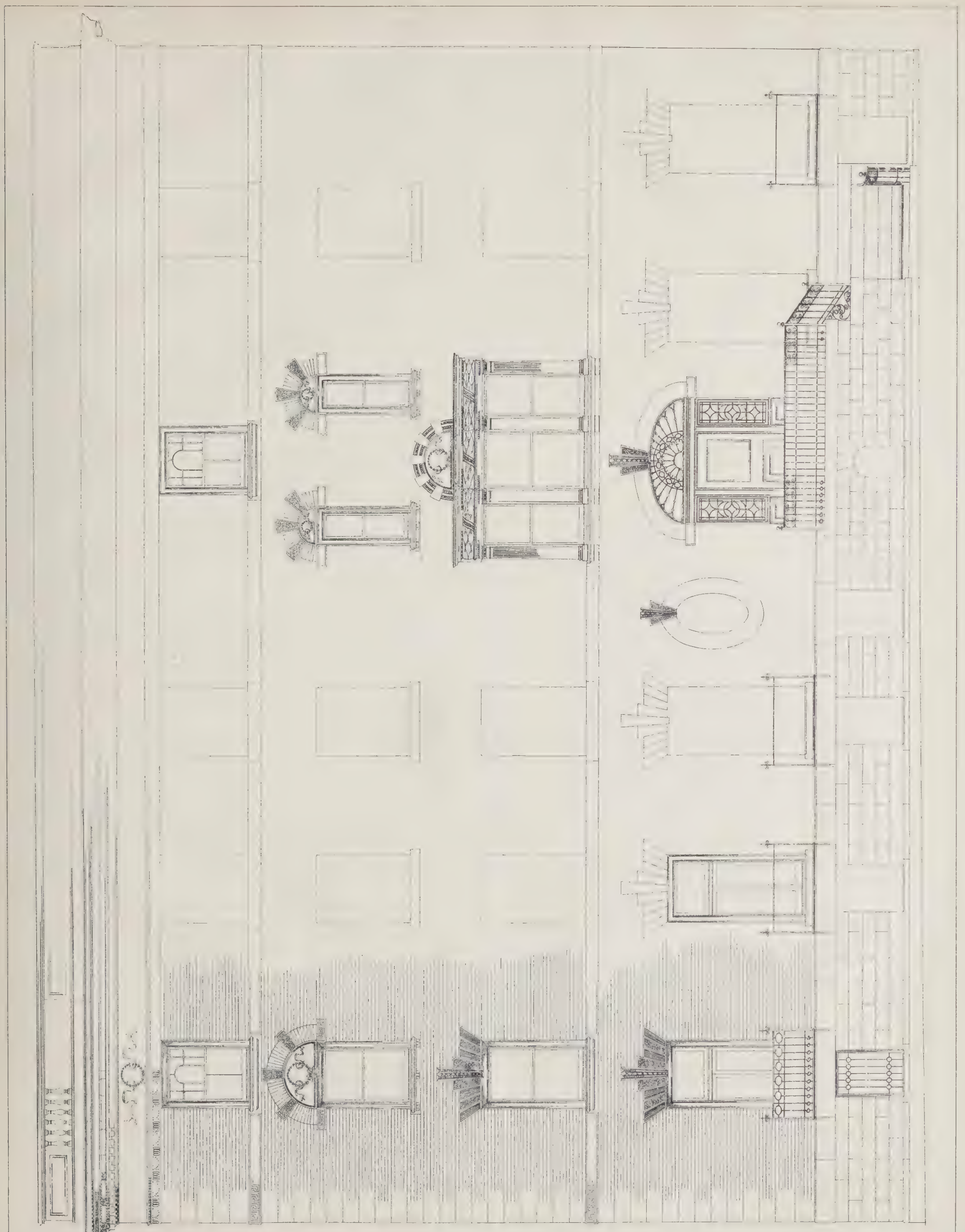
BRUCE PRICE, ARCHITECT, 150 FIFTH AVENUE, NEW YORK.

OFFICE BUILDING FOR E. L. KELLOGG & CO., 61 EAST NINTH STREET, NEW YORK CITY.

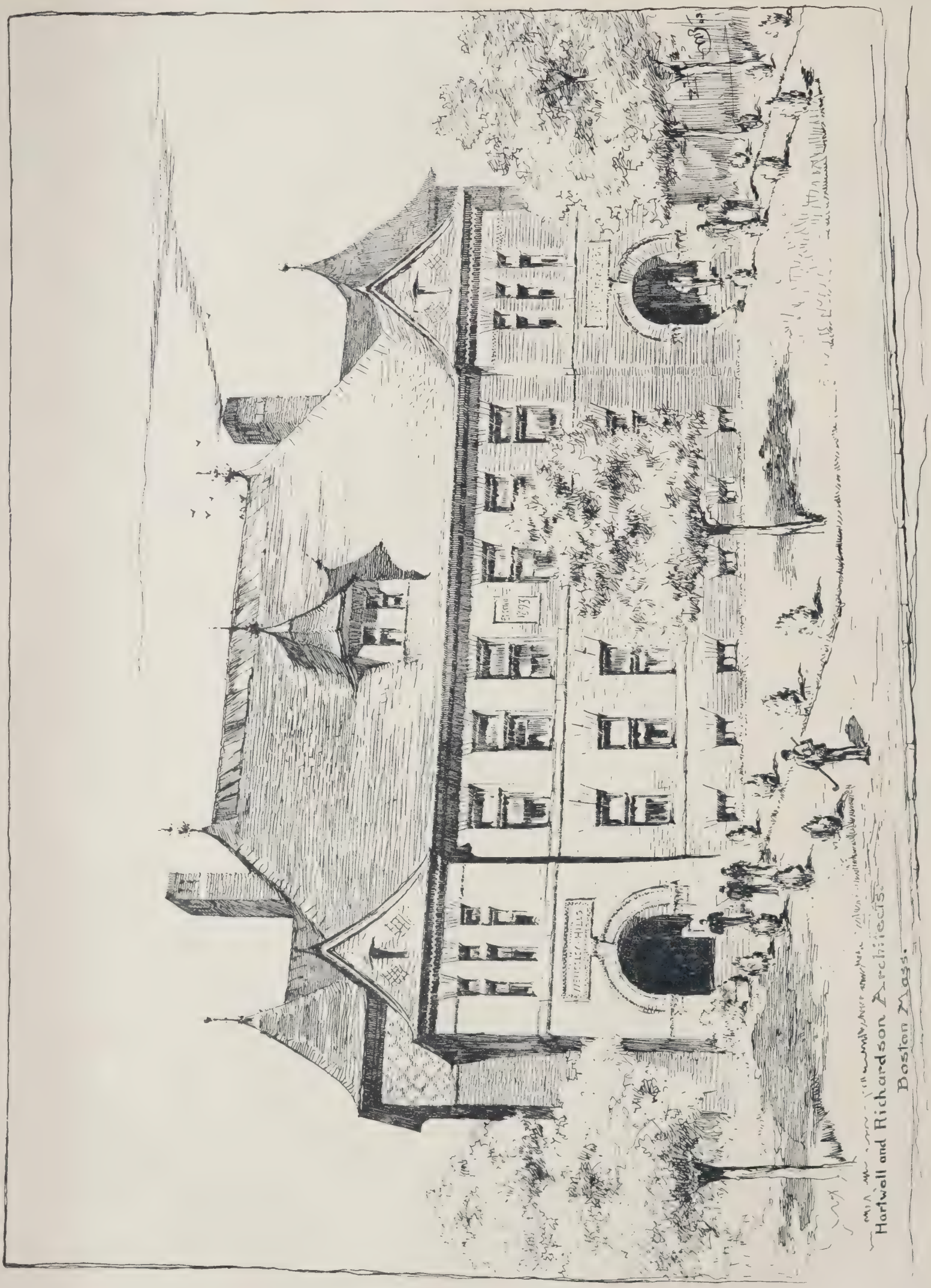
WILSON EYRE, JR., ARCHITECT, 927 CHESTNUT STREET, PHILADELPHIA.

SES, 138TH AND 139TH STREETS, NEW YORK CITY. ELEVATION ON SEVENTH AVENUE.

BRUCE PRICE, ARCHITECT, 150 FIFTH AVENUE, NEW YORK.



KING MODEL HOUSES, 138TH AND 139TH STREETS, NEW YORK CITY. ELEVATION ON 138TH STREET.
BRUCE PRICE, ARCHITECT, 150 FIFTH AVENUE, NEW YORK.



FIRST SCHEME FOR HIGH SCHOOL BUILDING, WELLESLY, MASS.

HARTWELL & RICHARDSON, ARCHITECTS, BOSTON.

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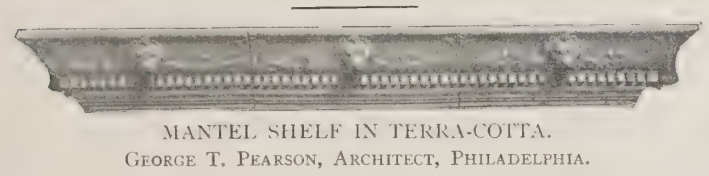

MANTEL SHELF IN TERRA-COTTA.
GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA.
EXECUTED BY STEPHENS, ARMSTRONG & CONKLING.

THERE is an increasing tendency among architects to use decorative bonds and diaper patterns in their brickwork, and once well started this ornamental feature will almost certainly be carried to an extreme and then dropped altogether. In good hands, diaper patterns are a most effective means of architectural decoration, but in this, as in color design of all kinds, safety lies in restraint, and in different tones of one color. A hundred designers may be successful within these limits where one will succeed with contrasting colors. But it is the designers without training, without restraint, without color sense, who will first rush into the use of strongly contrasting colors. The successful men use contrasts sparingly, depending more on such slight differences as texture, and the varieties of color in the same lot of brick. Then, too, a diaper pattern is a decorative feature, and should be so used. It is seldom satisfactory when used over broad surfaces, without definite borders. Many of our readers will remember the photographs of Shiplake Court, published in this paper in 1892; this building illustrates both good and bad use of diapers. When a pattern is carried over a wall surface irregularly broken with windows, as in several places at Shiplake Court, we think it is decidedly bad architecture, especially with the strong contrasts used there. On the other hand, there are examples where a certain clearly defined space is decorated with a diaper; for instance, some of the chimneys running up from the ground, that are exceedingly successful. For broad friezes, diapers are among the most useful motives. We have published several admirable examples of their use in this way, among them Mr. H. Langford Warren's house for Mr. Page in Boston, and some of Messrs. Hartwell & Richardson's school buildings. It is not our intention here to discuss the matter in detail, for we shall publish a carefully prepared article by a writer who has not only given diaper work a careful study, but who has had ample opportunity in practice to carry out his ideas and verify them. It will not be out of place, however, to throw out a word of warning as to the use of contrasting colors, inasmuch as the drawings do not indicate the actual effect of the buildings as erected; and those who may be led to trying diaper work for the first time will be pretty certain, if they go by the drawings alone, to use contrasting colors.

THE wonderful beauty of coloring of the commonest rough brick wall, under favorable conditions, is little appreciated even by those most likely to observe such effects. This was brought very forcibly to our attention the other morning by a glimpse through a window at a wall some fifteen feet away covered with the brightest sunshine. The wall in question was the back, or alley wall of a block of tenements, built as cheaply as the law allows. The contractor had apparently bought the lowest priced bricks in the market, though they seemed hard and sound. A coarse white mortar had been used, and the bricklayer seemed to have given no attention to striking joints. Study of the wall showed that the bricks ranged from almost a buff to a dark green, running through a variety of reds that could hardly have been more brilliant. Of course no attempt at sorting had been made, and the success was wholly due to the "jury" builder who had cheapened the job in every possible manner. While we do not want to argue for cheap work, we do wish to suggest that, in country and suburban houses, brick can be used very cheaply and very charmingly, if the "jury" builder's methods are followed in all but the workmanship. Brick residences in smaller towns are usually considered beyond the means of the average house builder. This is largely because of the prevailing impression that they must be of fine front brick. In the first place, the bricks must be shipped from some large city where a fine front brick is made. There is a great increase in the cost to start with. Then they must be laid *very, very* carefully, with thin joints. Then each joint must be gone over and beautifully finished. The result — well, we are already on record as to this. Let the builder buy his bricks from the local brickmakers, and begin right, in a certain way, by patronizing home industries. In these days there is hardly a town of consequence in the United States where good common bricks are not made. Get good, hard-burned bricks, no matter if they are a little crooked; use plenty of mortar and *build well*, but do not sort the bricks for color. Such work, with any kind of a simple, well-proportioned design,

is certain to result far more satisfactorily than the modern method. We go abroad, admire the wonderful color effects of old work (helped out often by sunlight we do not get here, we will admit), then come back and build houses of pressed brick sorted to an absolutely uniform color. Pressed front brick has its uses, and it is invaluable within its province; but there are places where it should not be used, and one of the principal ones is in country and suburban work.

THE Romans, as all the world knows, were not artists. They appropriated from others the decoration of their buildings, and applied it with anything but artistic feeling. This veneer destroyed, as it has been on most Roman ruins, the true genius of the Roman people is revealed. They were, of all nations, a nation of builders, of engineers. Their works of construction stand to-day, a guide for all who have come after them. Their construction was essentially a brick construction, and as a feature of THE BRICKBUILDER we purpose publishing in 1894 a translation of Auguste Choisy's "L'Art de Bâtir chez les Romains," which will be illustrated by one hundred cuts in the text, and twenty-seven large lithographic plates. This book, although not very old, is an out-of-print work no longer quoted by the publishers. In the second-hand bookstores of Europe it sells at ten dollars and upward, depending upon its condition. In presenting it as a feature for 1894, we will give all illustrations the same size as the originals, and a careful, accurate translation of the reading-matter. The book is an authority, and for every student of architectural construction will be well worth a subscription. Another reprint that will be an 1894 feature will be George Edmund Street's work on the brick and marble architecture of North Italy. The parts relating to brick and terra-cotta take up so large a portion of the book that it comes well within the scope of THE BRICKBUILDER. This is also an out-of-print book, and very hard to get hold of; but it is so often referred to, and is so highly prized by those who possess copies, that we have decided, if only for the draughtsmen and students who read THE BRICKBUILDER, to include its publication among the features of the coming year. The book is very profusely illustrated, and we purpose inserting reproductions of photographs of the buildings described, which will double the number of illustrations. We ask the practising architects among our subscribers to kindly call the attention of draughtsmen and students in their offices to these articles. When five or more draughtsmen form a club, a special subscription price will be quoted.

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THE BRICKBUILDER

Vol. II. BOSTON, NOVEMBER, 1893. No. 11.

A TALE OF BRICKS.

THERE are at the Exposition a sufficient number of what may be termed curiosities of classification — an electric piano, for instance, flaunting its meretricious qualities among the dignified, massive, and utilitarian steamships, locomotives, bicycles, and balloons in the Transportation Building — to make a difference of opinion that seems to exist with regard to the nature and proper location of bricks, and their consequent scattering over the many acres of the Manufactures, Mines, and Machinery Buildings, a trifle of no great importance, merely imposing upon any one interested in such articles the pleasant necessity of seeing the entire Exhibition incidentally to finding the divers exhibits of bricks and brickwork. Here, there, and everywhere they are to be discovered, either in massy structures, which are weighty evidence of their importance as a manufacture; in single examples, bearing witness in their forms to the richness of the natural resources of certain States, and to the character of the men who moulded them; or here in archaic forms, and there as examples of the latest improvements in brickmaking machinery; telling by their vivid contrast the story of civilization, of man's increase of elemental dominion, of the knowledge he has wrested from the passiveness of nature, of all he has gained, and a hint of what he has lost.

GERMAN GOVERNMENT BUILDING AT CHICAGO EXPOSITION.

ROOFED WITH LUDOWICI TILE.

In the northwest corner of the Manufactures and Liberal Arts Building is to be found the largest and most important exhibit of this nature, erected on the part of the various Hydraulic Pressed Brick Companies, showing the productions of these forms combined in a structure well adapted to display them in their many positions and uses, — in walls, plain or decorated; arches, round, pointed, and elliptical; gateways, chimney-pieces, window openings and cornices, friezes, panels, plinths, and bases galore. Bricks of all sorts, shapes, sizes, and descriptions, ranging the gamut of colors from cream to deep red, applied to all legitimate uses, and shown in every position that is to be encountered in brickwork. The bricks in general are good in color, artistic in appearance, with fine surfaces and every indication of being of the best quality; and, while there is an immense number of the kinds with which use has made us familiar, and which call for no other notice than a word of praise for the excellence of their manufacture, there are one or two examples of more or less novelty, which deserve a more extended mention. Noticeable in the east external wall of the pavilion is a panel of dark-brown bricks, made of clay with an intermixture of iron, which, with a pleasing color, have also an appearance of great strength, marking them as being of special service for bases and positions where

SECTION OF ROOF OF GERMAN GOVERNMENT BUILDING AT CHICAGO EXPOSITION, SHOWING THE LUDOWICI ROOFING TILE.

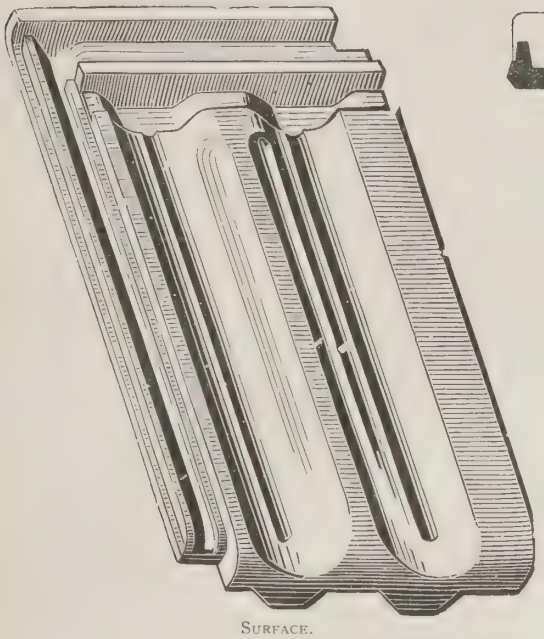
an indication of strength of substructure would be effective. A "flashed" brick known as "Pompeiian" makes a very pretty wall pinkish-yellow in color, the difference in the burning producing a softly defined band round the edge of the brick, which is slightly deeper in tone than the centre, with the result, in combination, of a wall surface deriving an effect of brightness and variety through the presence of the two tones, though sufficiently homogeneous in effect to prevent any spotty, hardly marked, or harlequin appearance. Incorporated in the west wall are some very pretty and individual bricks made by the mixing of fire and red clays, whose particles arrange themselves into an appearance resembling very fine gravel, making a very distinctive and pleasing surface. All the constructional work in arches and columns is very good, and the mantels, apart from a slight redundancy of ornamental brick, are quite interesting. The building — for such it is minus a roof — is altogether one of great popular interest, pleasing the many of the public as well as those technically interested; the varied colors of the many different bricks used never clash, but are most harmoniously arranged, and the exhibit is a successful one in many ways. The Chicago offices of the various companies interested are in the Chamber of Commerce Building, No. 302, where the different bricks included in the exhibit may be seen and judged with greater facility than is possible when they are part of a wall.

Passing from the Manufactures to the Mining Building, a large number of bricks are to be found among the exhibits of the different States whose mining industries have located them in this section of the Exposition. Viewing bricks in this association, the beautiful colored ores among which they are shown would seem to be good models for brickmakers in their present endeavor to produce bricks of every conceivable hue. The samples generally are of a high standard of excellence, with local peculiarities of clay in one or two cases which render them more interesting; all are shown separately, and no attempt at any architectural form has been made, nor any endeavor to add other interests to their exhibition as bricks pure and simple, except in one or two cases, where samples of the clay are shown in connection with the brick, and in the display marked by the name of the New York State Museum, where the clay products of New York, shown in the various forms of bricks, drain tiles, sewer pipes, etc., have the chemical combination carefully pasted on each sample.

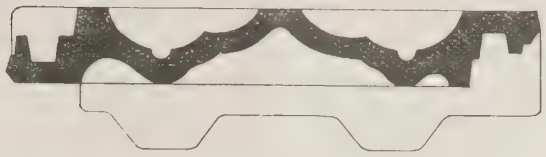
Among those specially noticed in these State exhibits the Golden Pressed and Fire Brick Company of Denver, Col., have a very good general display, including some

SECTION OF ROOF OF GERMAN GOVERNMENT BUILDING AT CHICAGO EXPOSITION, SHOWING THE LUDOWICI ROOFING TILE.

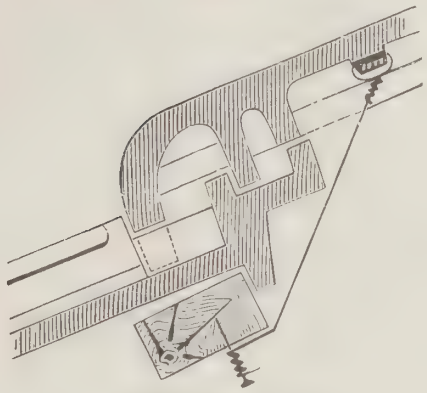
good dry-pressed bricks, a mixture of blue and white fire clay, and some clay roofing-tiles made from plastic clay, a golden brown in color, which would make a delightful



SURFACE.



CROSS SECTION.



DOUBLE LOCK ON HEAD.

DOUBLE LOCK ON SIDES.

combination with the mud brick shown by the same people. From the Salt Lake Pressed Brick Company of Salt Lake City come some red pressed brick uniform in color and evenly pressed, which have every indication of strength and the other qualities identified with good bricks, virtues which are also to be found in the wares of the Anderson Pressed Brick Company of Ogden, Utah. The pressed bricks of the company manufacturing at Albany Falls, Pend d'Oreille River, Ida., have a wonderful depth and richness of color in the yellow and red varieties.

The State of Wisconsin has two entrances of terra-cotta which are interesting in detail, and the exhibit contains some very good pressed bricks, which one is unable to praise specifically on account of the absence of any name by which they could be identified. Missouri surrounds the treasures she has extracted from the bosom of Mother Earth with an enclosure mainly constructed of terra-cotta, which is sufficiently good to make one wish that the upper portion were also of this material instead of the wood on which has been imposed the hopeless task of endeavoring to imitate it. A number of columns standing on a low wall and supporting a cornice and frieze outline in good manner the area occupied by the State, allowing through the open intercolumnar spaces an unobstructed view of the general arrangement of the exhibits made. The caps of the columns are patriotic combinations of eagles and acanthus leaves, and the columns themselves are adorned with cherubs' heads and pendant strings of that peculiarly Renaissance form of fruit and floral decoration which Mr. Ruskin has somewhere gently referred to as ropes of luscious ugliness. The terra-cotta is very well made, and comes from the Winkle Terra-Cotta Company of St. Louis, while the Roman bricks of the base were supplied by Messrs. Evens & Howard of the same town.

The Peerless Pressed Brick Company of Philadelphia have a comparatively important exhibit containing many examples of ornamental bricks and terra-cotta. Some of the Gothic detail of the latter is interesting, and among the pressed bricks a kind streaked with red and yellow in the manner of some marbles seems as though it might be used advantageously in certain cases. Bricks composed of crushed slate, and others of shale, exhibited respectively by the old Bangor Slate Company and the Mil Hall Brick Works of Lock Haven, Pa., seem to possess considerable hardness, and, being dry-pressed and going directly into the kiln without the intermediate processes attending clay manufacture, are produced at a much cheaper rate than are these latter.

VIEW OF ROOF FROM UNDERNEATH, POINTED UP WITH CEMENT OR MORTAR AFTER LAID.

Japan is the only oriental nation whose mining exhibit includes any bricks, and they have only some fire bricks, which are of good and even manufacture, the main difference between them and the home products seeming to be the Japanese characters in which what is presumably the

name of the manufacturer is impressed on the bottom of the brick. Regarded collectively, the bricks in the Mining Building lose in effectiveness as an exhibit by their distribution, the method adopted by the Hydraulic Pressed Brick Companies in the Manufactures Building being the more successful both in imposingness of appearance and the better presentation of the bricks they control.

A roofing tile of German invention and make, recently patented in this country, and which comes with German

THE CELADON TERRA-COTTA COMPANY'S EXHIBIT.

endorsement of a very high character, is shown in a booth at the north end of the Mining Building. Its successful and extensive use in Germany has resulted in a company being formed for its manufacture in this country, which, under the name of the "Ludowici Roofing Tile Company," representing the firm of Carl Ludowici of Ludwigshafen, Germany, announces that a factory has been erected at Chicago Heights for the manufacture of their patent. Various testimonials which are published, emanating from architects and manufacturers in Germany, bear witness to the high merits of this tile as a roof covering, though one is bound to remark that such an epistle as the following — "My residence was roofed in the year 1861 with Ludowici tiles, and I testify with pleasure that it has since required no repairs" — would be of more service in enabling the public to judge of the worth of the tile if the date of writing were affixed. This little matter is carefully or carelessly overlooked in every testimonial dealing with extended periods of use, though, on the other hand, more specific information is given by others, who bear witness to the satisfactory use of this tile for lengths of time varying from four to twelve years, without any necessity for repairs arising. The German Building at the Exposition is covered with this form of roofing material, and from examination seems to fulfil all that is claimed for it in the way of weather-proof qualities, while it is at the same time very sightly. The inventor states that the present shape of this tile is the result of many years of experiment and invention, and that it is the prevailing roof for government buildings, factories, breweries, and depots in Germany, a class of work which one generally associates with good materials excellently adapted to their various uses. The principle on which the Ludowici tile are made is one of interlocking joint at sides and ends, which affords protection against the ingress of moisture, and at the same time, by the absence of any rigid fastening, permits a certain freedom in the joint, allowing a slight motion without rupture. Upon inquiry, the information was given that the actual cost of the tiles was as great or greater than those now in the American market, but that the ease and quickness with which they may be laid, the absence of any necessity for boarding or supplementary roofing of any kind,— the tiles being hung directly upon laths, — make their initial cost much less than that of other tiles now in the market, while the yearly amount for repairs which is usually necessary is a direct saving. All colors and kinds are procurable from dark red to green, and from unglazed terra-cotta to glass.

The Celadon Terra-Cotta Company have also an exhibit of roofing tiles in the Manufactures Building, including some ornamental ones, which are vigorous and well designed. Of the utilitarian side of this company's products one is unable to speak, for, unfortunately, the manner in which they are laid is not shown; so one is unable to judge if any weather-proof qualities are allied to the æsthetic merits upon which the manufacturers seem principally to rely.*

[*See Editor's note on next page.] GEORGE M. R. TWOSE, Chicago.

THE CENTRAL HIGH SCHOOL, NEW BRIGHTON, PA.

THE above illustration is a reproduction from the architect's drawing of a school in Pennsylvania, possessing some very interesting features for those interested in the decorative use of common brick. Plates 65, 66, and 67 show the details to large scale. There are no moulded brick except in the roll at main entrance. Red and buff paving bricks made by the Williamsport Brick Company were used. The first floor contains six school-rooms, a teachers' room, and superintendent's room. The second floor has seven school-rooms, and the third floor two laboratories and a hall with four hundred and fifty seating capacity. The cost, not including heating, was $32,000. The serious drawback to using common brick decoratively is the difficulty of getting a contractor who can do such work, and, if he can, who will take enough interest to turn out a creditable job. Much credit is due to the contractor, Mr. George Krueger of Johnstown, Pa., for the conscientious way in which the architect's drawings were followed; and the fact must not be overlooked, that, in spite of the careful drawings, a less competent or an uninterested contractor might have spoiled the work. So much of the success of good brickwork depends upon the builder that we take pleasure in mentioning success of this sort.

[The tiles made by the Celadon Terra-Cotta Company, besides their artistic characteristics, have unusual features in their method of interlocking, securing an exceedingly storm and wind proof roof.

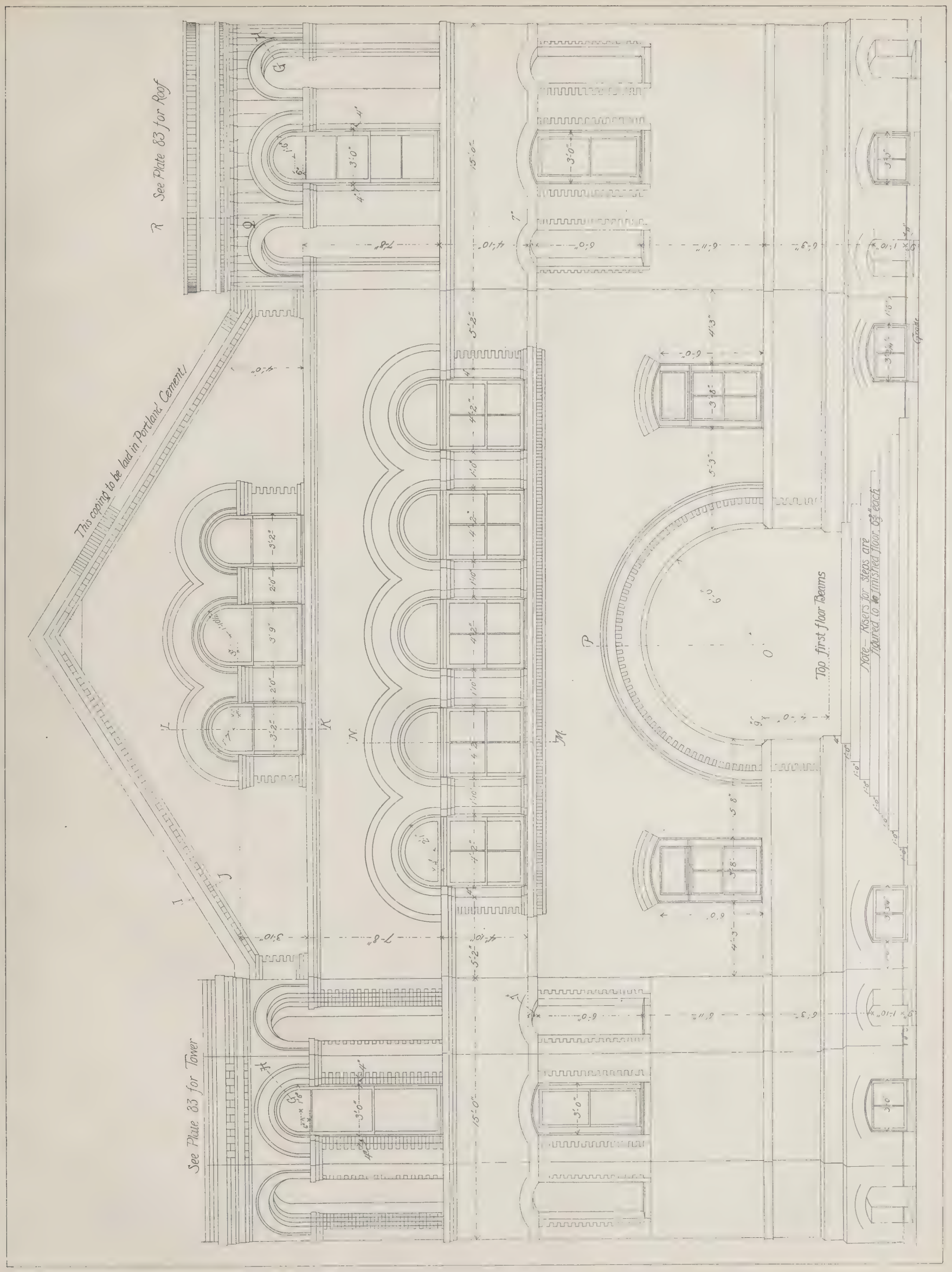
Their "Combination" tiles all have three-quarter-inch interlocking flanges, which not only prevent the entrance of rain, snow, or wind, but give the bold reveal characteristic of these tile. These interlock in a manner similar to the well-known diamond tile, — though with very much deeper flanges, — but are so constructed that all the great variety of forms may be interchanged in any combination, without in any wise interfering with the thorough interlocking of each tile in the combination.

The "Conosera" (interlocking cones) also has flanges from 5/8 inch to 1 1/2 inches in height, — which interlock at every point of contact, — every tile interlocking with six others. In addition to this, their construction is such that they make tight joints even when the tiles are somewhat warped. All clays are liable to warp more or less in baking, but the clay used by the Celadon Terra-Cotta Company is peculiarly free from this fault, so that these tiles are rarely warped enough to be perceptible in the laying.

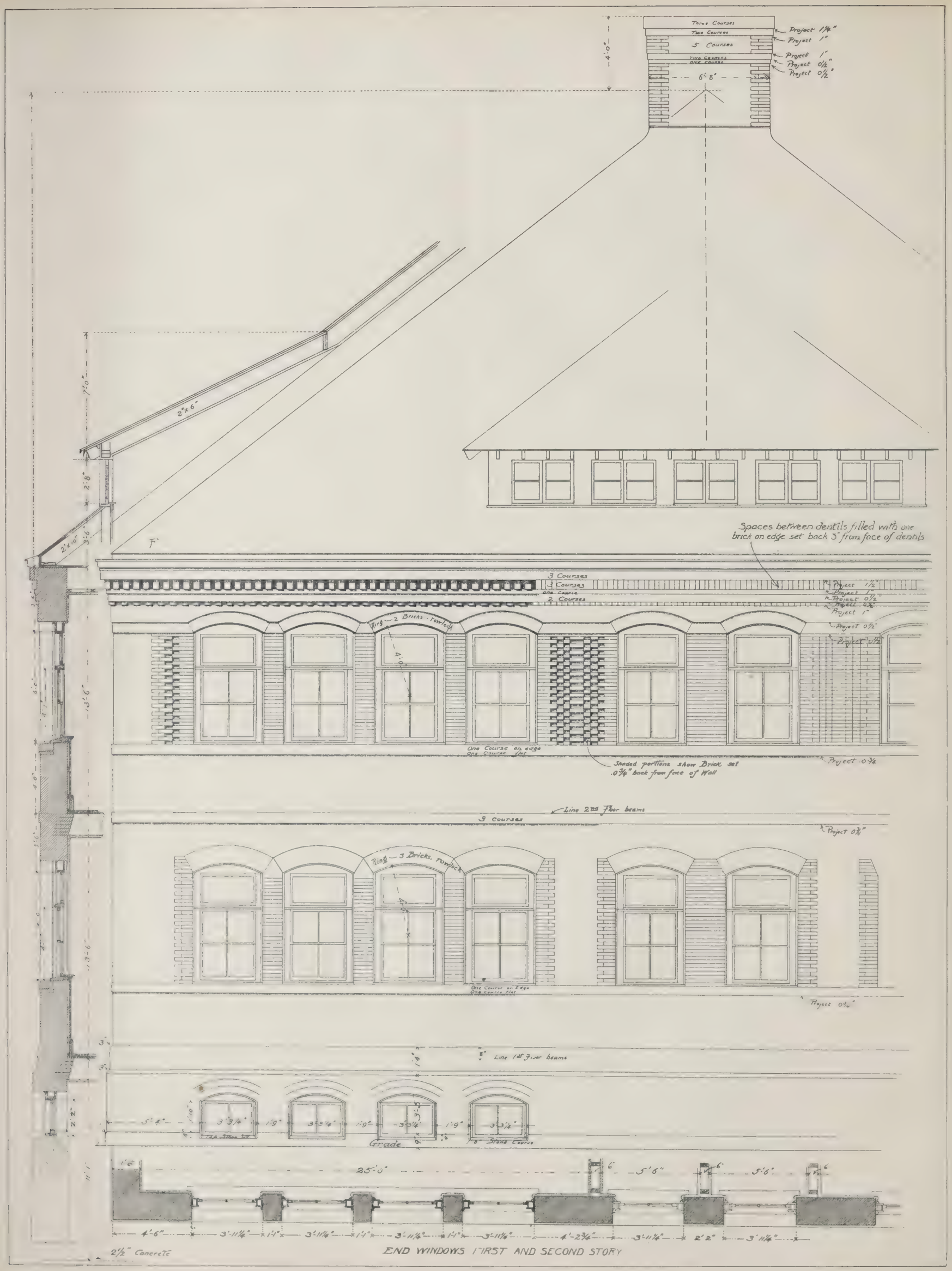
But while the tiles of this company are adapted to make a very tight roof when laid up dry, they can be laid in cement, when the roofer or architect desires to take that extra precaution, in which case they require but about half the quantity necessary to make ordinary tiles tight.

This company is also bringing out a very novel "Shingle" tile, which while having all the features of value in the ordinary flat shingle tile; has a thorough interlocking device making them absolutely storm-proof even without cement. They will also admit of being laid "close" or "open" with equal tightness, in the latter case making what the company claims to be the lightest and cheapest tile roof ever laid. — EDITOR BRICKBUILDER.]

PRIMARY SCHOOL FOR THE CITY OF BOSTON, HAROLD AND HOMESTEAD STREETS.
EDMUND M. WHEELWRIGHT, CITY ARCHITECT.
BUILT OF CARTCRAIG SCOTCH FIRE BRICK. SEE ARTICLE ON PAGE 103.



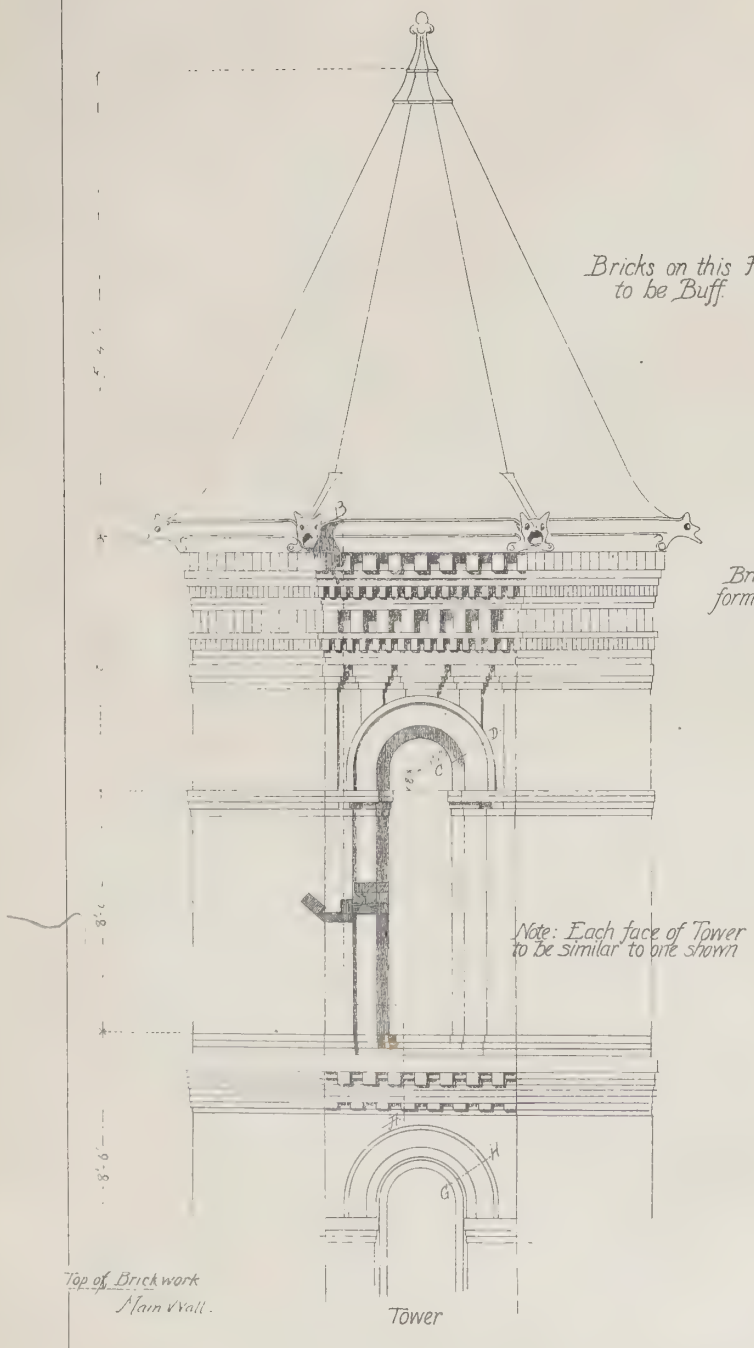
ELEVATION OF CENTRE OF PRINCIPAL FACADE, CENTRAL SCHOOL BUILDING, NEW BRIGHTON, PA.
FRANK IRVING COOPER, ARCHITECT, PITTSBURGH.

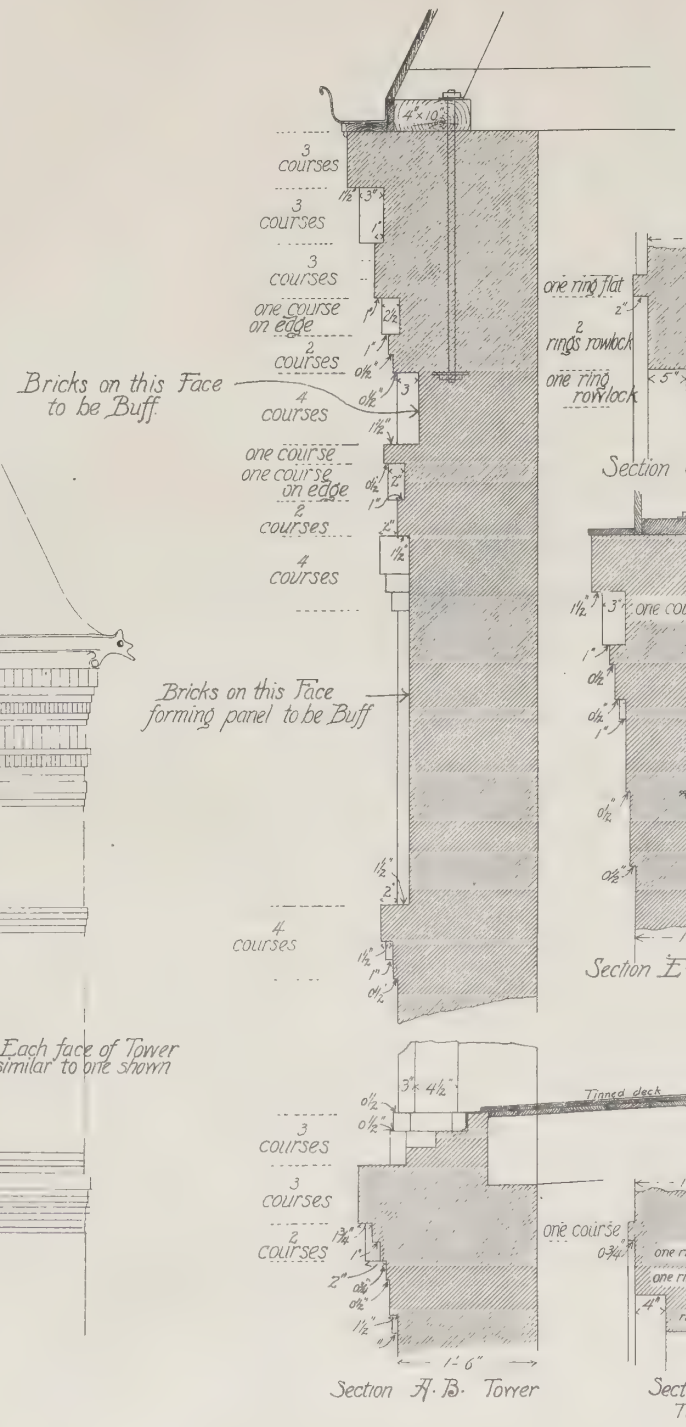


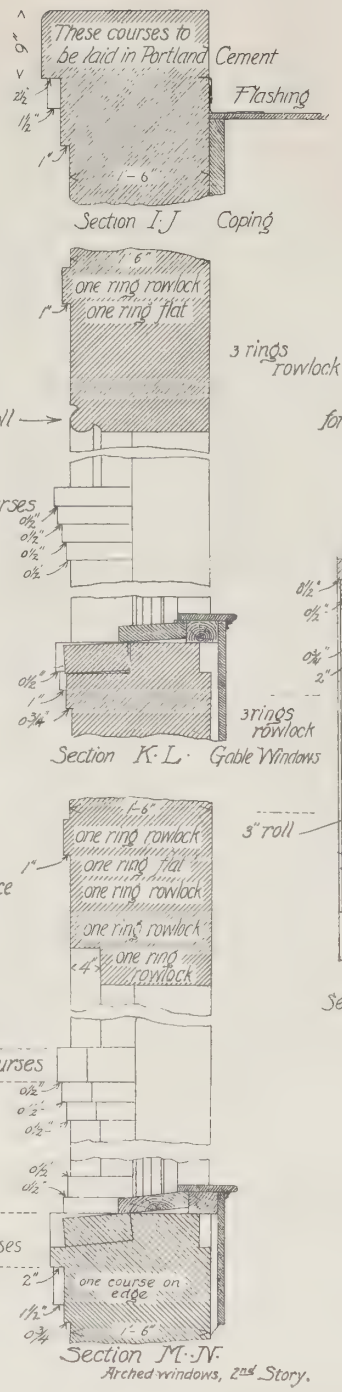
END WINDOWS FIRST AND SECOND STORY

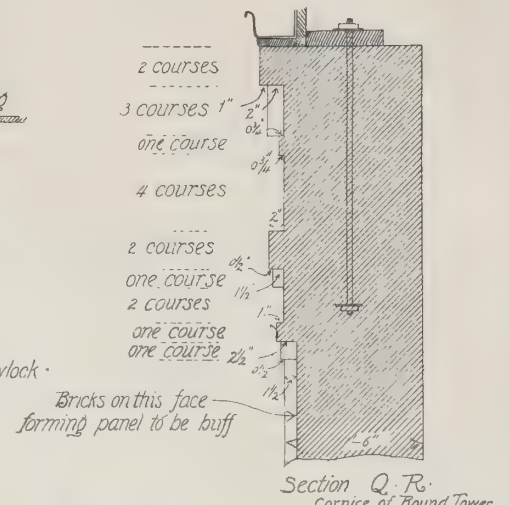
END ELEVATION, CENTRAL SCHOOL BUILDING, NEW BRIGHTON, PA.

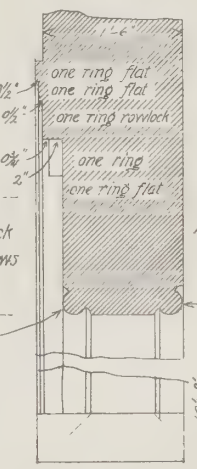
FRANK IRVING COOPER, ARCHITECT, PITTSBURGH.

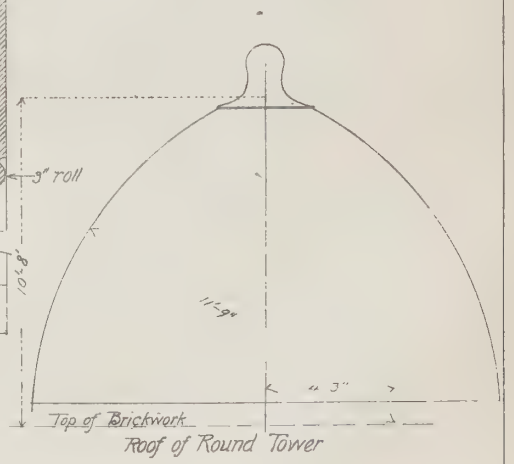






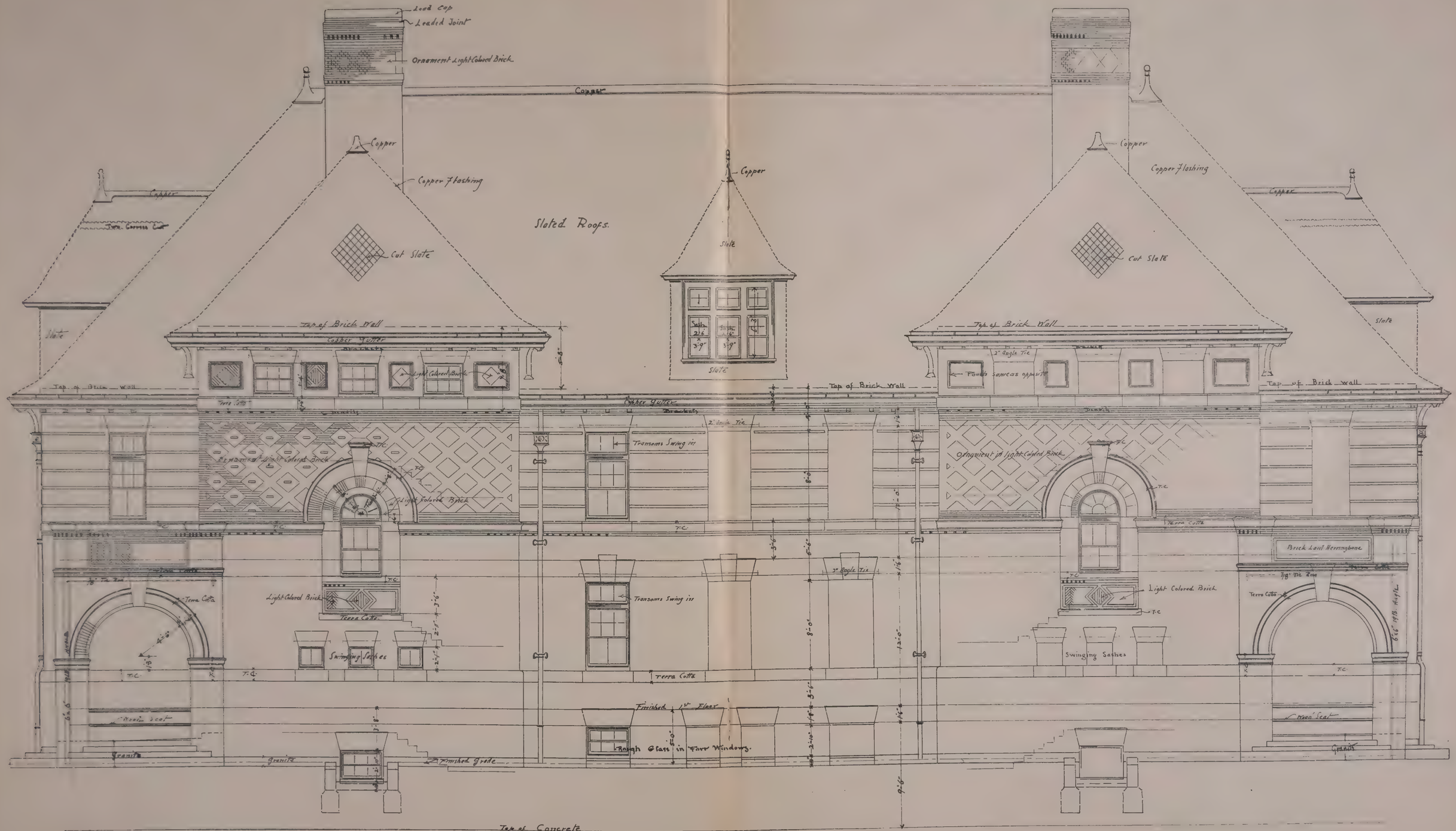






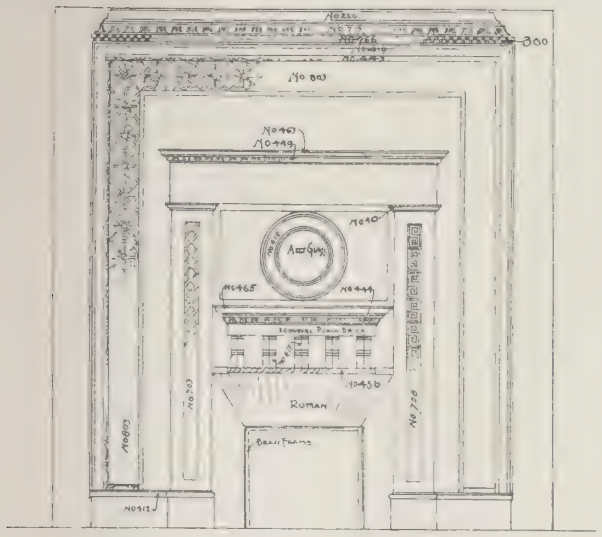
DETAILS OF CENTRAL SCHOOL BUILDING, NEW BRIGHTON, PA.

FRANK IRVING COOPER, ARCHITECT, PITTSBURGH.



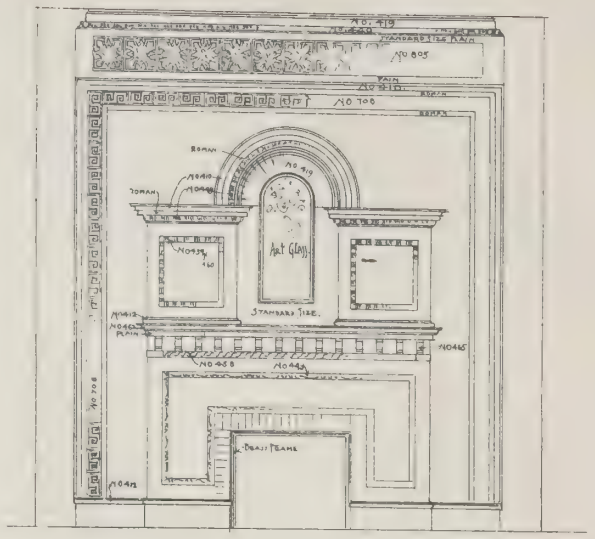
FRONT (NORTH) ELEVATION OF THE NEW HYDE SCHOOL BUILDING, NEWTON HIGHLANDS, MASS.

MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON.



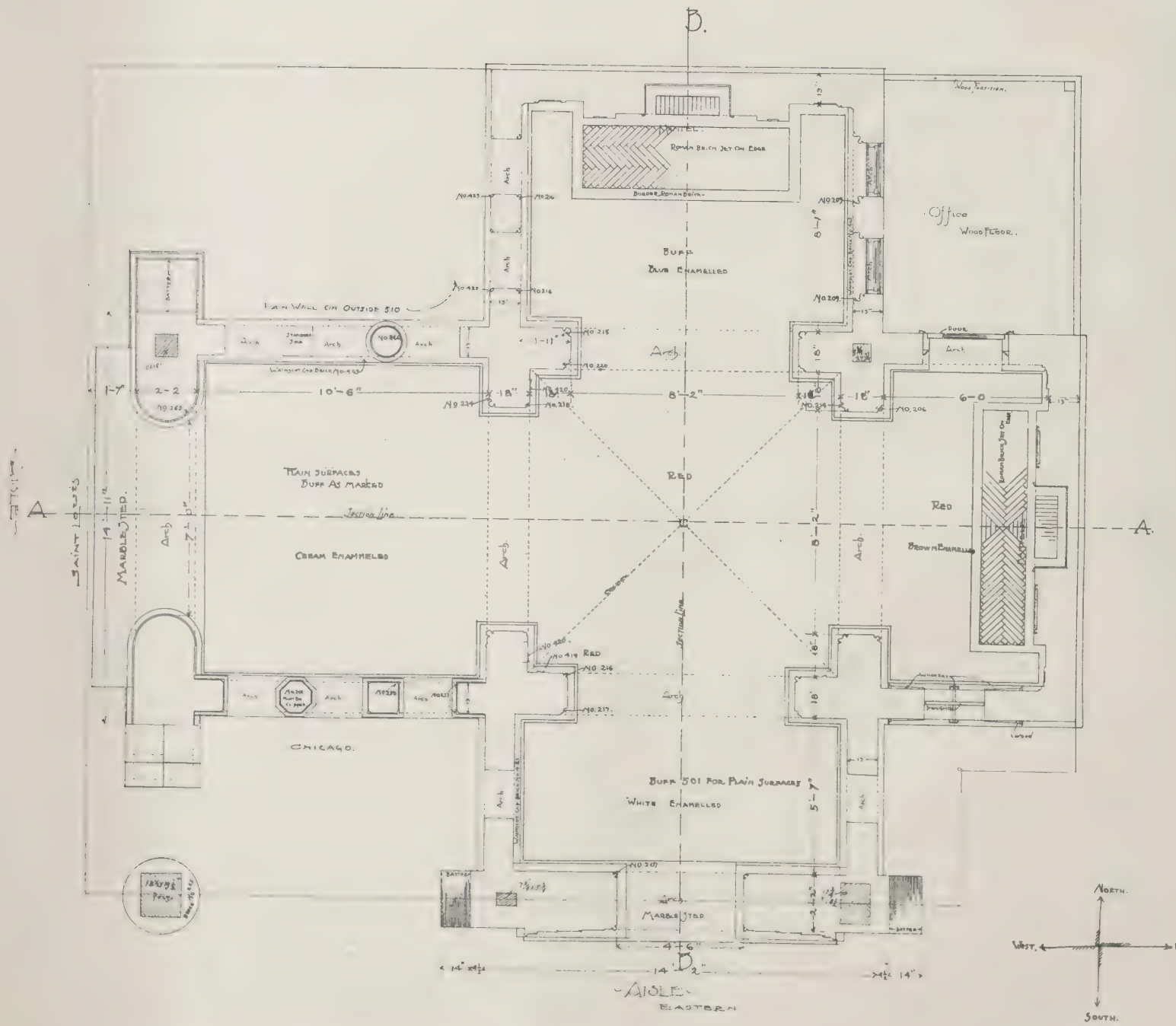
NORTH BRICK MANTEL

BUFF 30C EASTERN



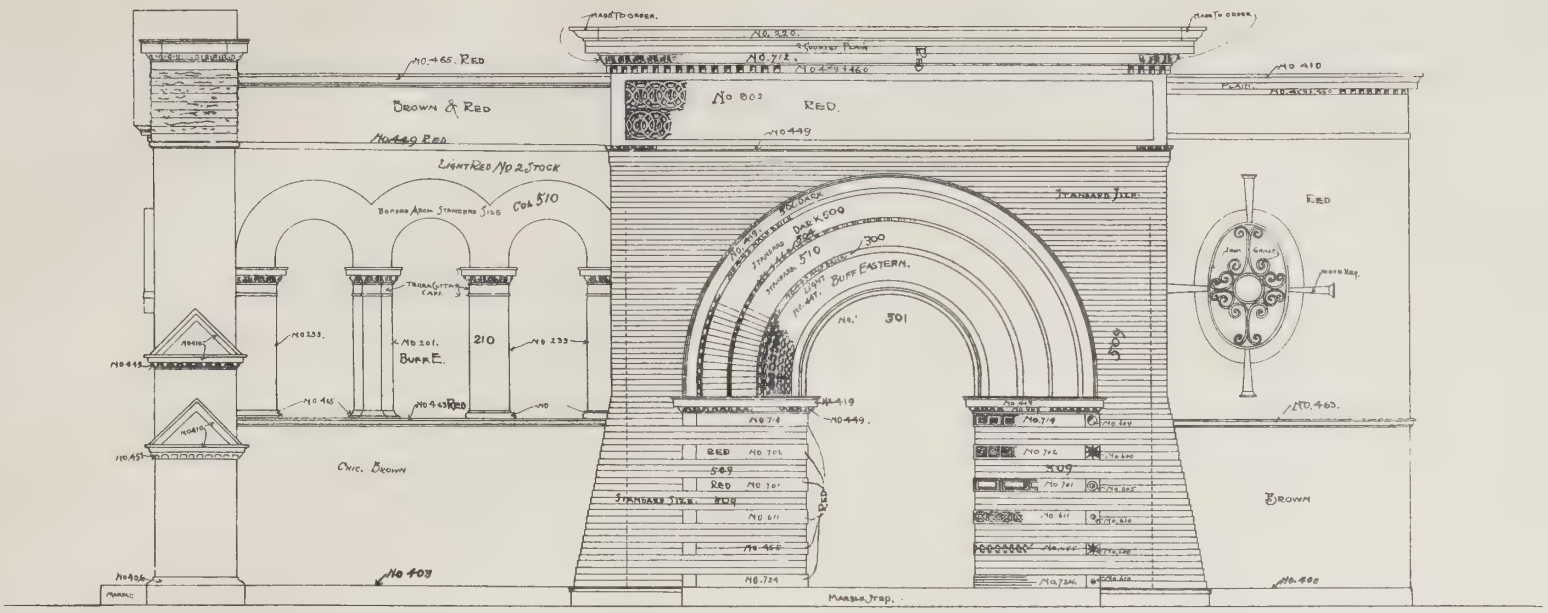
EAST BRICK MANTEL

RED BRICK ST. LOUIS.

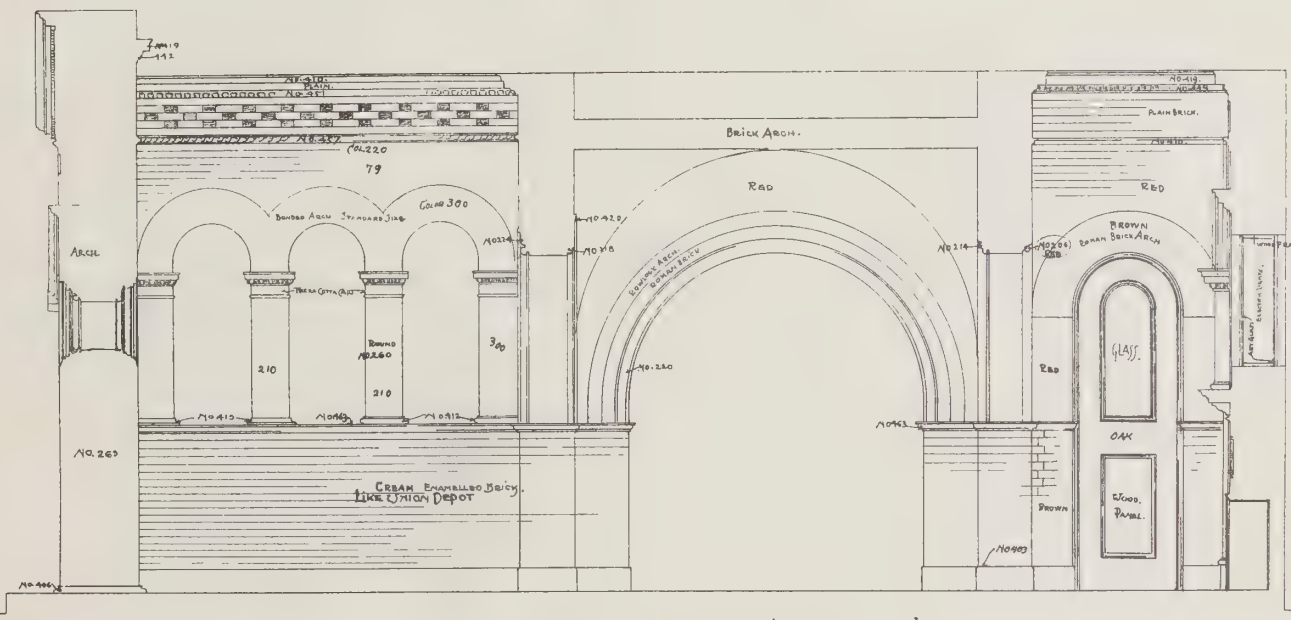


SCALE DRAWINGS OF THE WORLD'S FAIR EXHIBIT.

UNITED HYDRAULIC-PRESS BRICK COMPANIES.



ELEVATION ON AXLE



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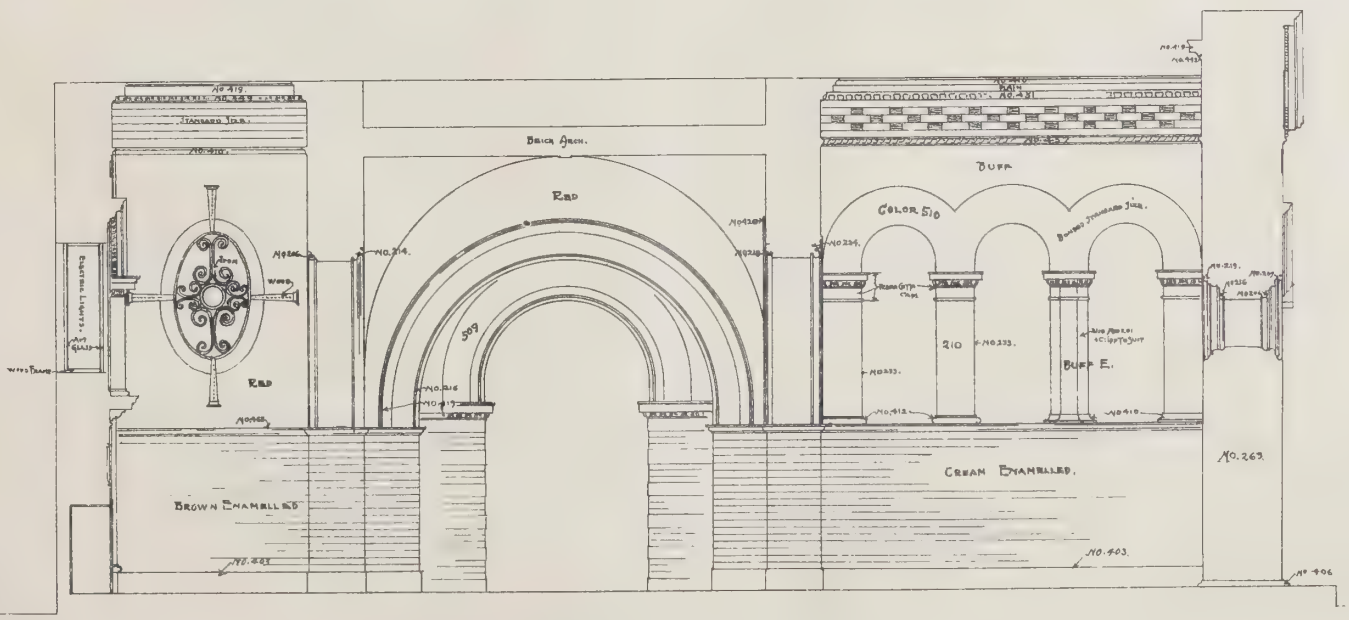

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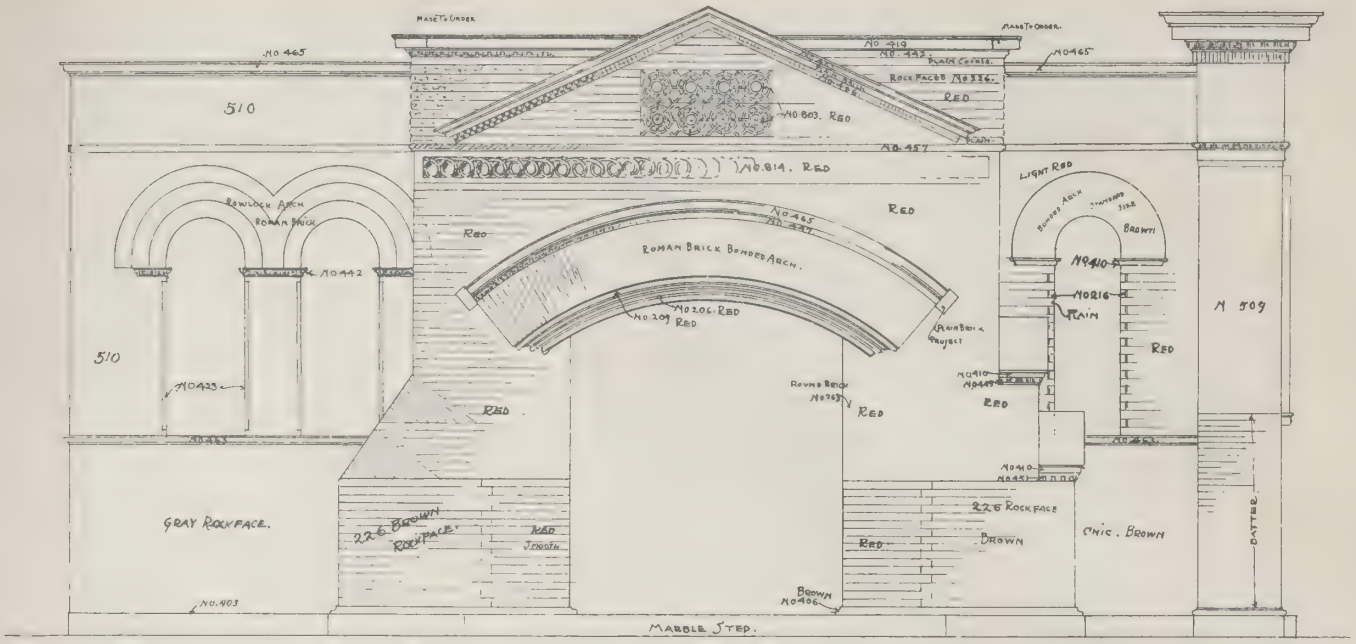
SCALE DRAWINGS OF THE WORLD'S FAIR EXHIBIT.

UNITED HYDRAULIC-PRESS BRICK COMPANIES.



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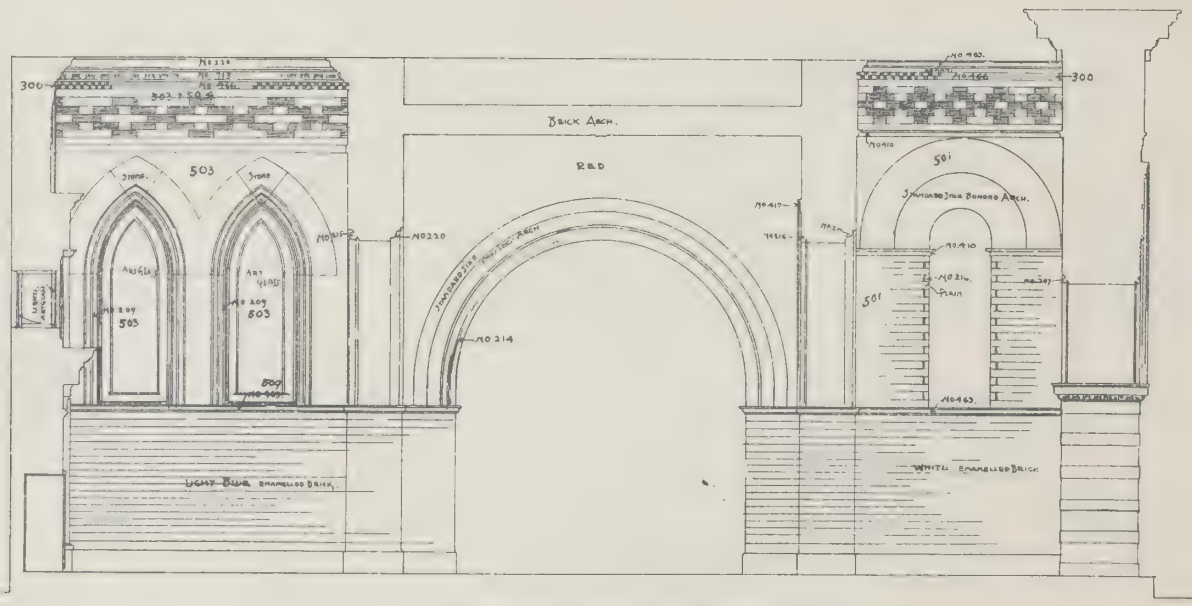

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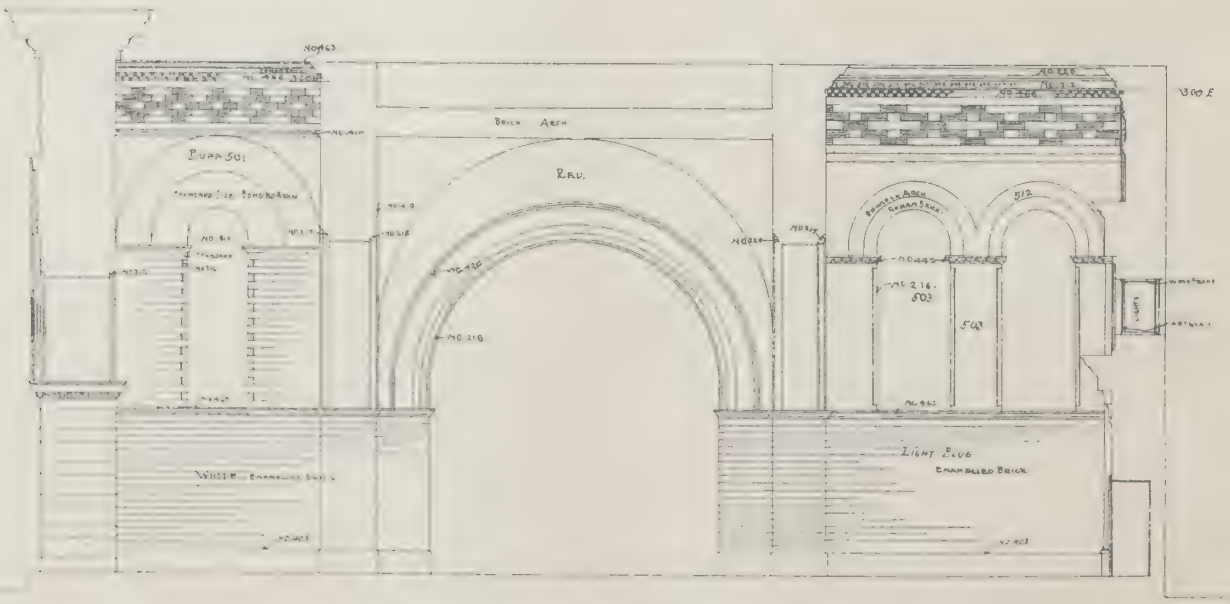

SECTION THRO. E·E LOOKING EAST

SCALE DRAWINGS OF THE WORLD'S FAIR EXHIBIT.

UNITED HYDRAULIC-PRESS BRICK COMPANIES.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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STOCK DESIGN FOR SPANDREL TREATMENT.
BOSTON TERRA-COTTA COMPANY.

"SOME brickmakers may say, 'I don't care what is done with the brick after they leave my yard.' This is taking a very narrow view. Every saving which can be effected in the handling of brick at every stage, and which tends to improve, and lessen the cost of brick buildings, reacts directly in favor of the brickmaker. It is not large *versus* small brick: it is brick *versus* stone, iron, wood, and every other building and paving material." The above is quoted from a letter in *The Clayworker*, by Mr. R. M. Greer of Tuxpam, Mexico. It is sound, solid sense, but decidedly lacking in the majority of brickmakers. Mr. Greer believes in a large instead of a small brick, and very ably states his convictions. But let the manufacturer believe in whichever size he will, so long as he believes in brick of some size. He is neglecting opportunities for profit if he does not concern himself with his bricks after they have left his yard.

STOCK DESIGN FOR CAPITAL.
BOSTON TERRA-COTTA COMPANY.

A WRITER in a recent issue of *The Clayworker*, speaking of the development of clay-building materials and the needed reforms in domestic architecture and construction that these materials render possible, makes these very sound remarks: "The great fault with people who propose reforms in constructive methods is, that they give so much attention to construction alone that the idea of appearance is wholly neglected. Reformers of this character are usually so much interested in the practical character of their work that they neglect that which is pleasing to the eye."

THE BRICKBUILDER, while thoroughly advocating reforms which will replace much of the dangerous frame building with systems of terra-cotta lumber, and block construction, does not intend to lose sight of the necessity that this construction should be architectural in the true sense of the word. In fully satisfying artistic requirements lies its only ultimate success. THE BRICKBUILDER, more than any other journal published, stands in a position to successfully prosecute these reforms, if any kind of co-operation is forthcoming from the architects and manufacturers. Both of these classes it reaches and interests as does no other periodical. The clay-working papers, with the exception of *The Clayworker*, confine themselves to the narrow field of manufacturing. The architectural papers are wholly professional. Therefore the former fail to interest the architects, the latter do not reach the manufacturers as they should. In THE BRICKBUILDER both sides are considered. The policy of the paper from its first number has been to draw together the architect and the manufacturer, to get them to work together for their own best interests and for the development of architecture in materials of clay. In its columns, therefore, open letters and communications will be brought to the attention of all interested in the subject. Our plate department gives every facility for drawings illustrating methods writers wish to bring up for discussion, and this is placed at their service. Let those who are earnestly in favor of improvements along the lines suggested start the ball rolling at once.

FOUR times in as many recent days has the purpose of THE BRICKBUILDER to give aggressive attention to the matter of fireproof construction been strengthened, and three times has the old, sad story of wretched construction been told by the daily press to a public already surfeited with the narration of similar tales of woe. Springfield, Columbus, Detroit, tell the tale. Nine business blocks, two theatres, and an hotel destroyed, — a loss of above $2,000,000,— and several lives lost. The fire at Columbus was a poem in the way of a practical lesson on construction, two theatres and the Chittenden Hotel falling prey to fire in less than one hour and thirty minutes. Will the long-suffering American public ever learn the lesson?

The experience at the Hotel Metropo e, Philadelphia, is the one bright spot in the history of recent hotel fires. A large can of gasolene became ignited in the basement of the hotel, and burned fiercely for five minutes or more. Happily, the fireproof construction of the Pittsburgh Terra-Cotta Lumber Company stood the trying ordeal, and the necessity for another calamity column was obviated.

WE learn that Mr. J. L. Worthy of Springfield, Mass., owner of the Hotel Glendower, which was recently destroyed in the great fire, is to rebuild at an estimated cost of $75,000. The lesson taught by this fire should enable our friends, the fire-proofing manufacturers, to find ready ear in Springfield.

THE new Tariff Bill submitted by the Ways and Means Committee is at hand too late for more than casual notice in the current issue. We note a reduction to twenty per cent on unglazed brick, and thirty per cent on glazed or enamelled brick, and, with surprise, a return to the *ad valorem* system, which in the past has afforded so many golden opportunities for under-valuation. While the reduction in duty is accountable upon a variety of grounds, and may be safely charged to purpose and theory honestly held, the deliberate abandonment of the specific system in levying duties seems inexplicable. Time and time again, for an instance, have "extra" fire-brick been purposely chipped by the exporter, and invoiced through our customs houses as the damaged article. "Damaged" they certainly were, but not in a way that would injure the brick in appearance or utility; and now it is not only proposed to subject the American fire-brick manufacturer to a very material decrease in protection, but also to open the ports of our country in such a way that a torrent of under-valued goods will pour in upon him, with results that can hardly fall short of annihilation. We shall eagerly scan the columns of the *Record*, when debate comes upon the Wilson Bill, for evidence of the ground upon which the Ways and Means Committee recommend the return to a system condemned by the business man long ago.

THE domestic Portland and hydraulic cement men have secured a well-earned victory for their industry, at the hands of the Ways and Means Committee, the Wilson Bill recommending a duty of eight cents per cwt. on the above, or, in other words, recommending no change. Mr. R. W. Lesley, of Lesley & Trinkle, Philadelphia, represented the interests of the cement industry before the committee; and the result speaks volumes for the presentation of the case, and harmonious, intelligent unity of purpose in business. We regret that space and time forbid a review of the evidence placed before the committee, in this number, but the December issue will contain a synopsis of the *pros* and *cons* as gleaned from "Tariff Hearings of the Ways and Means Committee, 1893," just at hand.

CHINA clay, or kaolin, suffers a reduction of duty in the Wilson Bill of one dollar a ton. We doubt if the industry would be materially injured should this Wilson clause become a law. This move of the Ways and Means Committee will, in our opinion, place most of the dollar in the pocket of our English cousin, the steamship owner.

EVER up to date in business ideas, the Eastern Hydraulic-Press Brick Company of Philadelphia has established a permanent exhibition in the Metropolitan Life Building, Madison Square, New York City, where may be seen fifty varieties of front brick in standard and Roman size, and in all the new shades of color. A sufficient number of each color to properly represent the appearance when laid in the wall may there be seen. As it is quite impossible to fairly represent colors with a single sample brick, particularly where the effect desired is produced by varieties of shades, the idea of the company should prove particularly successful in acquainting those interested, with their extensive ability. The New York room is in no sense a soliciting point, but a simon-pure exhibition; and it is extremely instructive and interesting.

GOOD construction is exemplified in the roof of the new building of the Mutual Life Insurance Company, Liberty and Nassau Streets, New York City. Upon the deck is placed a layer of 2½-inch hollow brick, over which in turn is laid a coating of Portland cement one inch in thickness, the whole being covered with heavy copper sheeting. The inclines of the roof are laid with the Celadon Terra-Cotta Company's "Giant" vitrified roofing tile.

ATTENTION is called to the gratifying increase in our advertising columns this month. It is a decided recognition of the value of THE BRICKBUILDER as an educator in its own particular field, and as an advertising medium. 1894 will see a marked development in THE BRICKBUILDER. Encouraged by success, with every department strengthened, THE BRICKBUILDER is maturing plans for next year which are bound to command attention, and make for it a permanent home in the family of trade journals. The December number will contain an outline of our plans for next year.

THE GARTCRAIG SCOTCH FIRE BRICK.

FOR about fifteen years, Messrs. Waldo Brothers have imported the Gartcraig Scotch Fire Brick, selling it for the same purposes other fire bricks are used. It has not as yet been employed to any great extent architecturally, and it is but recently that architects have used it successfully enough to attract especial attention to it. The brick differs from other brick in that the clay is actually mined as coal or iron is mined, it lying much deeper than any American clay in use. In burning, it comes in actual contact with the fire, and the heat in the kiln is far greater than any it is likely to be submitted to in a burning building, therefore making carefully built walls well-nigh indestructible, and in little danger of damage from the general run of fires. In setting in the kiln, the front faces are protected from the fire, but the backs, where exposed, are colored a rich brown. It is by laying these backs to the front, as Mr. Wheelwright has done in the Harold and Homestead Streets School and other buildings, that the strongly variegated effect is secured.

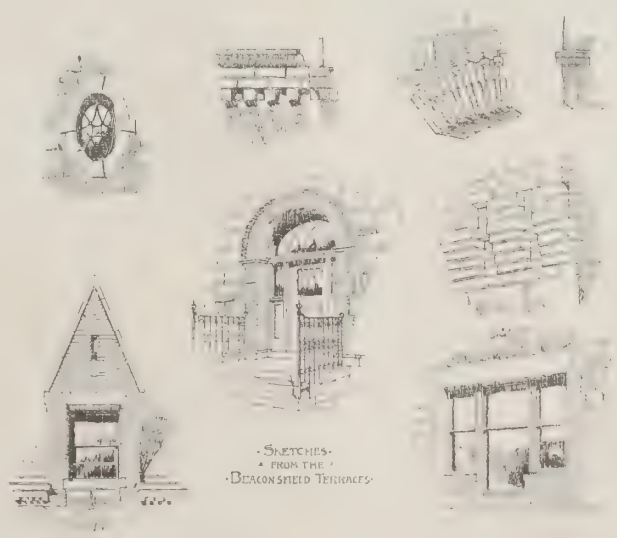
Messrs. Fehmer & Page, we believe, in 1889 first used this brick architecturally in the addition for R. H. Stearns & Co. on Temple Place, Boston, the front faces being here used, so that a fairly uniform color is secured. Since then it has been used in a number of cases, among them, besides the ones illustrated, the Hathaway office building, corner Atlantic Avenue and Summer Street; an office building on Congress Street extension; a dormitory in Cambridge (James Fogerty, architect); and the engine house at Ashmont (now nearing completion), by City Architect Wheelwright. The last building for which this brick is specified is the Reuter Stable, Jamaica Plain, by J. Williams Beal.

Beyond the cheapness compared with other good brick of light shades a great advantage this brick presents is the variety of shapes and sizes at a uniform price, giving great opportunity for decorative work, of the rough texture so often desired. The group of sketches from the Beaconsfield Terraces, by Fehmer & Page, illustrates this, and reference to the accompanying diagram of stock sizes will still further explain the advantage.

The large size of the *square* brick, 2½ x 4½ x 9, is in its favor, for other shapes give smaller sizes for use in decorative laying. The *soap* brick for small dentils, and the *split* for label moulds and other places where a flat or narrow brick is wanted, are two shapes, which, with the *square*, are all that a clever designer needs. But, without extra cost, a variety of arch and circle brick can be had. A few data in regard to these will be interesting and directly useful to any who may consider using the brick.

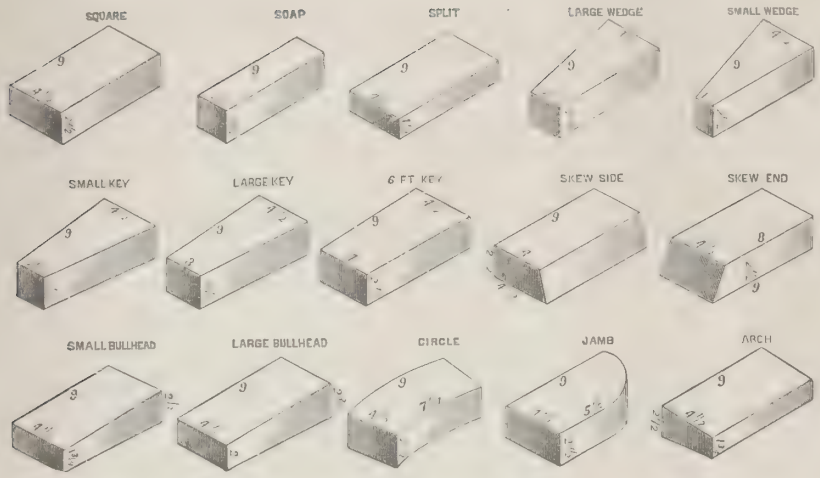
WELD STABLE, BROOKLINE, MASS.

WHEELWRIGHT & HAVEN, ARCHITECTS. SCOTCH FIRE BRICK BY WALDO BROTHERS.



A circle, 58 inches inside diameter, will take just 84 of the *large bullheads;* one 48 inches, 84 of the *small bullheads*. It takes 56 of the *6-foot key* for a 6-foot circle. A circle, 36 inches inside diameter, is turned by 15 *circle* brick; while 39 *arch* brick turn a circle of 26 inches, inside diameter. 36 *large key* turn a 36-inch circle, and 32 *small key* a 28-inch circle. By using a proportion of *square* with the shape bricks larger circles can be turned. Study of the diagram which shows all the sizes will be well worth the time of every architect.

A second advantage is that it is always in stock. Being imported for a large and steady fire-brick trade, all shapes are kept on hand in large enough quantity to immediately supply and keep up with any architectural demand. The importers call it an "emergency" brick: it is always ready.



Messrs. Waldo Brothers have long been associated with everything needed in masonry building. This Scotch fire brick is only one line brought into more than ordinary prominence by recent use of it. The Weld stable is to our mind one of the best things Messrs. Wheelwright & Haven have done, and it is the first bold use of the mottling this brick affords. In the Harold and Homestead Streets School we think the mottling a little too strong, but the building will not always look as new as it does now, and a little time will improve it.

POLICE STATION, BRIGHTON DIST., CITY OF BOSTON.
E. M. Wheelwright, City Architect.
Scotch Fire Brick by Waldo Brothers.

In relation to terra-cotta work in New England, and especially in Boston, Messrs. Waldo Brothers have also held a prominent position, being the representatives of the Perth Amboy Terra-Cotta Company. Their first contracts for this company's products were, however, the Pompeiian brick furnished for Hastings Hall, at Harvard, (Cabot, Everett & Mead, architects), and Dr. Bradbury's residence, Exeter and Marlboro Streets, of which W. Whitney Lewis is the architect. The recent terra-cotta work is of more interest, and some of it is already familiar to our readers, through illustration in earlier issues. We publish here the Edison Building on Atlantic Avenue, Boston, by Winslow & Wetherell, and the Pope Building, by Peabody & Stearns. The details of this building were published in our July issue, which also contained the Legion of Honor Building (a Perth Amboy job), by Rotch & Tilden. The new Exchange Club, by Ball & Dabney, also contains some fine terra-cotta work supplied from Perth Amboy through Waldo Brothers. Outside of Boston are the Cook and Sloane houses at Lenox, Mass., by Peabody & Stearns; also the Masonic Building at New Bedford, by the same architects.

There are two other lines carried by Waldo Brothers of enough special interest to deserve mention here. The first is the Premier English Brick in two shades of buff. They are of large size,—9 x 4½ x 2½, 9 x 4½ x 2⅞, 9 x 4½ x 3¼,—are extremely hard, and do not change color. Their most important use is in the court yard of the new Suffolk County Court House (George A. Clough, architect). The large size brick is an economical one to use, as it takes a considerably less number for a given amount of wall.

POPE BUILDING, BOSTON.
Peabody & Stearns, Architects.
Perth Amboy Terra-Cotta by Waldo Brothers.

The second is the Welsh Quarry Tile, a cheap, extremely hard, non-porous tile, appropriate for paving terraces, yards, etc. It comes in three colors,—red, buff, and blue; in sizes, 6 x 6 x ⅞, 9 x 9 x 1½, 10 x 5 x 1½, and 12 x 6 x 2. This same tile one often finds in the hearths of colonial houses, where it has stood for a hundred years or more. Lack of space prevents further remarks regarding these special lines of which Messrs. Waldo Brothers are the sole agents. The illustrations speak for themselves.

THE BRICKBUILDER

VOL. II. BOSTON, DECEMBER, 1893. NO. 12.

"WORKINGMEN'S HOMES."

THAT street of strange sights and novel experiences, the Midway Plaisance, whose name is polyglot, and whose inhabitants were polyglottous, — a thoroughfare dominated by a scientific and Brobdignagian whirligig, denizened by camels and Hottentots, primitive man, and *fin-de-siècle* beauties, where paradoxical lions dwelt in beautiful domesticity with tigers and keepers, opposite Irish villages whose cleanliness, contentment, clog-dancing, and absence of pigs were truly remarkable, — was not, upon the whole, a place that presented to the mind of any one who had traversed its mile of blare and gaudiness any association especially connected with home life, domestic environment, or any incentive to save and attain that proud position of citizenship held by the house owner. And yet, close to the entrance of that howling street of nations, was a little structure of brickwork catalogued as the "Philadelphia Workingman's Home," a small two-storied house, unnoticed by the main part of the crowd which, blinded by the glare of the meretricious shows around, passed by unheeding, unconscious and unsuspecting that a neighborhood where respectability was at a discount could contain one of the most important exhibits that the entire Exposition had to offer, and one whose bearing upon the social and economic problems of the day was of the greatest importance. There is good in all things, and benefit perhaps resulted to this Philadelphia house even from its location, for it was in most distinct contrast to, and had its appearance of cosiness and the suggestion of home comfort that it offered, greatly heightened and vividly emphasized by the Beauty show next door, where, it is reported, forty beautiful ladies of forty different nations, apparently benefited by the recent Congress of Religions, gave a charming exposition of the sisterhood of women, receiving with smiles all who, after a small formality of depositing twenty-five cents, were admitted to their presence, and dwelling together in a unity wherein racial differences were forgotten, international questions ignored in a most well-bred way, and Zaida of Greece chatted confidentially in Irish with Margit of Sweden, while the Welsh lady spoke fluent English with a distinct cockney accent. Such a "Congress of Beauty" from its very nature would and did greatly heighten, by contrast, the charm that always clings around a home, though its inmates are unknown or only imaginary; and the workingman's house in question gained in effectiveness, though it may have lost in popular attention through its neighbor.

The Model Philadelphia Workingman's House (to give it its full title) at the World's Columbian Exposition, 1893, was erected by the Social and Economic Science Committee of the Woman's Auxiliary of Philadelphia, and is not so important considered by itself as it becomes when examined as a type of 172,000 similar homes which have been built in Philadelphia, which are occupied and owned by 172,000 families of incomes varying from $15 to $25 per week, such ownership not only conferring the benefits of greater comfort, greater privacy, and consequently greater domesticity, — or, to quote Mr. Talcott Williams, "allowing each family to have its own bath-tub, its own yard, its own staircase, and its own doorstep, simple daily blessings that are not enjoyed by half the people who live in the world's great cities," — but creating an improved status of the individual, which is bound to have an important and beneficial effect upon many vexed questions of the day.

This typical home was erected at the World's Fair to show to all who made the pilgrimage thither how much has been done in Philadelphia to enable men of moderate income to own their own homes, and it is understood that the erection of the house at the stated cost of $2,200 is possible, apart from any connection with building societies, and is not dependent upon any number being built at once. This fact, it is to be hoped, has resulted in variations of design in those built, for the prospect of block after block, and street after street of houses all alike, and perhaps similar to that of Jackson Park, is one that appals. The site occupied is a city lot lighted front and rear, the width 15′ 0″ and the depth of the house 43′ 00″. There are two stories and a basement, the first floor containing parlor, dining-room, kitchen, exterior w. c., front hall and side entry; while the second floor is divided into two bedrooms, a sitting-room, and a bathroom. A range built-in in brickwork, a dresser and sink in the kitchen, a wardrobe in the front bedroom, the furnace, and all sanitary fittings are included in the cost given.

In studying the plan it is interesting to do so in connection with that used for another model home belonging to the New York State Exhibit, which was located at the south end of the grounds. This house was built of wood, and is thus somewhat beyond our consideration, and, being a suburban house five feet wider than the Philadelphia one, comparison of the two, point by point, would be unfair; but one may remark that, though calculated for the use of a man and family on a lower basis of wage-earning than the Midway model home, New York State has produced a house which seems better in plan, general arrangement, and a common-sensical view of things generally than the more expensive and ambitious, but less satisfactory one of Philadelphia.

In the former we have a house of absolute simplicity of finish, but one whose plainness of appearance, instead of impressing with the idea of poverty, seems to be rather that of the virgin canvas waiting to record the touch of the painter, or like unstained paper, upon which shall presently be impressed the thoughts of men. This simplicity of wall and ceiling and furniture, all plain and unadorned, and ready to receive such impress of individuality as the future tenants may feel inspired by the opportunity to confer, seems as though it must appeal to the mind of any man (omitting absurd distinctions of workingmen) to a much greater degree than the unpleasant decorations of the Philadelphia model home, where nasty upholstered furniture, cheap tiles, and wood upon which a foreign appearance has been violently impressed, render the interior tasteless, and destroy, in ambitious attempts at grandeur, the normal charm of plain and legitimate appearances. To take the fireplaces as standards of comparison of the different spirit which dominates each building, the living-room, in which the Board of General Managers of New York State rightly think a man supporting a wife and family on $500 a year might pleasantly pass his leisure hours, contains a brick fireplace and mantel, whose simple dignity and appropriateness would please the æsthetic tastes allied to the possession of $5,000 per annum, — tastes that would shrink, however, from an association with the tile and wood combinations that pose as adornments and mantels in the Philadelphia house, — mantels which are utter shams, as they are attached in some cases to chimney breasts which contain no fireplace at all, but only flues for the furnace smoke and pipes, and in other instances to pieces of wall that have not even the excuse that the presence of a flue might afford for such false appearances.

A modified expression of such opinions addressed to a bright, intelligent woman attached to the Philadelphia household, who may be taken as a type of the wives whose husbands own these homes, produced replies which presented the family of the workingman of $15 to $25 weekly income in quite a new attitude, and threw a deal of light on what is presumably the effect of the example of people of wealth upon those less endowed with the world's goods. In a comparison of the New York and Philadelphia model homes, the mistress of the latter replied to a remark that the former seemed good in substance, fitted for their daily work, becoming to their rank in life, and well adapted for the inhabitation with order and dignity by poorer members of the proletariat, by the following summary: —

1. That the New York people thought that anything was good enough for workingmen, and expected them to put up with anything given to them.

2. That the New York house had only two rooms on the first floor, a kitchen and a living-room, instead of a kitchen, dining-room, and parlor, and, though the former were large and well-proportioned, she preferred smaller but separated rooms, as it was unpleasant either to have to eat food in the room in which it was cooked, or, alternatively, to have to sit in the room in which food had been eaten.

3. That, though the New York house had a bathroom, it was not conveniently situated. This inconvenience overrode any consideration of the greater economy effected by its position.

4. There was no sitting-room upstairs in the New York model home corresponding to the one in the Philadelphia house, "where one could have one's books and undress the children in the evening, and sit if one had one's wrapper on, and did not want to come down and see visitors."

5. And, generally, further conversation elicited the facts that the parlor was in constant use as a sitting-room, and had usually a piano in it; that the sham fireplaces were regarded with favor, and other false appearances were gladly tolerated, if not actually welcomed.

When one considers the conditions of squalor, unsanitariness, cheerlessness, and the utter lack of brightness or interest that are usual in and around the dwelling-places of the poorer classes, and which may be seen any day by simply taking a street-car ride through these portions of our cities, it is impossible to praise too highly any movement that has resulted in providing houses such as Philadelphia has done by tens of thousands. The vast benefit to society accruing from their possession and inhabitation by the people whose homes they are, the better sanitary and moral conditions that must obtain, and the improved attitude of individuals that must evolve from such conditions, are things that must be apparent to all and mark such movements as worthy of every encouragement. From two or three families in a room, to a whole house for each family, is a tremendous step forward, and, having taken that step, it now becomes necessary to consider whether such houses shall be, in the words of Mr. Ruskin, "suited to their habits of life, built as strongly as possible, and furnished and decorated daintily," or whether they shall be pretentious edifices substituting a false appearance of costliness for the beauty that is inherent in all material properly used; houses that shall incite their inmates to ape the manners and appearances of wealthier citizens, or houses which shall be factors in cultivating the taste of their owners, and teaching appreciation of proper pride and dignity of living. Although the ideas of life as it should be, expressed by the chatelaine of Philadelphia

House, are rather astonishing to one's pre-conceived ideal of such ladies, one can, on consideration, sympathize with many of the views of ease and comfort set forth, as being touches of nature more than recently acquired ambitions founded on observance of the manners of wealthier sisters. The acquiescence, however, in flagrant falsenesses, garishness, and other bad qualities may be due to several different causes; either because of a lack of appreciation of the badness of it all, or because, to lives wherein physical toil plays such a stupefying part, objects of bright and gay appearance, though such appearance may be unnatural or imitative, are most attractive by virtue of contrast; or it may be that, by conferring on common material a less well-known appearance, an idea of greater cost is conveyed, with an accompanying sense of elegance and refinement to natures incapable of seeing the viciousness of such methods. To which of these reasons it is due, or whether the architect alone should be credited with the achievement, one is unable to state; but the front of the house, which is pressed brick with stone sills, and stone lintel courses, is an example of the pretentiousness condemned, as is the entire area of the brickwork; not a single header is to be seen, nor are any other means visible by which this outer skin is incorporated with the rest of the wall, or made to perform any other duty than that of giving a false impression to the passer-by. If good building and pressed brick fronts together make a total of cost which is too great, it would certainly seem better to give up the pressed bricks than to sacrifice one third of the strength of the wall; and to healthy minds a wall of common bricks well built would recommend itself as infinitely preferable to a wall made up of two sections, one of doubtful strength and the other of no strength at all and of more than dubious morality.

It is in connection with matters of this sort that one finds the severest criticism that can be passed on this interesting exhibit. False fronts outside, and false appearances inside — to whom and what are they due? Shall the architect be blamed, or are these houses but a reflex of the lives of their inmates? If the former, the remedy is simple. Mr. Edward Atkinson is going to see about it at once (*vide American Architect*, Sept. 30, 1893); but if such conditions arise in answer to a demand, then the task of reform becomes more complicated: at any rate, it is a great pity that such a worthy movement should march hand in hand with such unworthy methods. The design of the house, apart from any technical defects, is not one that inspires the beholder with any very pleasurable emotions. A two-story house minus any appearance of a roof, and with narrow limitations of expenditure, is, undoubtedly, a hard thing to design beautifully; while the probable indefinite multiplication of the result into blocks and streets does not make the task easier. Recognizing these facts, however, it would seem that, if a simpler effect had been aimed at, a more satisfactory result might have been achieved.

Following is an extract from a pamphlet distributed at the building, which gives definite information of the worldly conditions of the people for whom these houses are erected.

1. Initials of head of family — E. W.
2. Address — 2300 Bouvier Street.
3. Married or single — Married.
4. Number of adults in family; number of children — Two adults.
5. Trade or business — Clerk in a shoe store.
6. Wages per week — $13.
7. Rent of house — $16 a month.
8. Description of house — Two-story brick with blue stone trimmings; three rooms on first floor; same on second; woodwork, pine; gas, water, and range in kitchen; bathroom in second story.
9. Hired help or not and wages — No hired help.
10. Marketing — Done at Ridge Avenue Market, or at store in vicinity of house.
11. Washing — Done by wife, or one half-day's work of washerwoman.
12. Sewing — Done by wife.
13. Bill of fare for breakfast ———
14. Bill of fare for dinner — Lunch in the middle of the day.
15. Bill of fare for supper — Nov. 11, 1892, stew of beef, potatoes, tomatoes; dessert, cake and canned peaches.
16. Cost of living per week — About four or five dollars. The head of the family can earn as much as $18 a week by extra work. The couple have saved money since their marriage in the fall of 1892.

1. Initials of head of family — W. T.
2. Address — 1034 Crease Street, Philadelphia.
3. Married or single — Married.
4. Number of adults in family — Two; number of children — One; ten months old.
5. Trade or business — Foreman or loom boss.
6. Wages per week — $16.
7. Rent of house — $14 per month.
8. Description of house — Two-story, sitting-room, dining-room, summer kitchen, range, hot and cold water, bathroom, two bedrooms.
9. Hired help or not and wages — No help.
10. Marketing — $4 per week.
11. Washing — Given out.
12. Sewing — Done at home.
13. Bill of fare for breakfast — Bread, butter, and coffee, and either oatmeal, potatoes, or eggs.
14. Bill of fare for dinner — Warm lunch for the man, bought near the mill; price, twenty cents.
15. Bill of fare for supper — Hot meat, potatoes, vegetables in season, tea.
16. Cost of living per week — Including clothes, rent, etc., $14 per week; is able to save $2 per week for building association.

The facts that are here represented bear witness more forcibly than anything else can do to the value of this movement, — a value that is so apparent and so real that adverse criticism, however slight, seems to partake rather of the character of hypercriticism. The consideration of THE BRICKBUILDER, however, from the essential character of the paper, is limited to the more material aspect which such a question presents, and if the necessary condemnation of certain features appears to outweigh the approval given to others, it is merely because extended discussion of these latter, from their socio-economic nature, lies rather beyond the scope of a journal devoted to the interests of architecture in clay, and not from any lack of appreciation of their great worth to the community.

GEORGE M. R. TWOSE.

A STATEMENT IN FAVOR OF HOLLOW BRICK WALLS, PREPARED BY E. BOYDEN, ARCHITECT, OF WORCESTER, MASS.

IN order to give a thorough knowledge of what is required, I quote the report made by the government officer of the Ordnance Department U. S. A., at Watertown Arsenal, of a test made of seven bricks from Providence, R. I., for the Norcross Brothers of Worcester, Mass., Sept. 14, 1892.

Test Numbers.		Dimensions in Inches.			Sectional Area.	First Crack. Lbs.	Ultimate Str. Total. Lbs.	Ultimate Str. Lbs. Per Sq. inch.
8698	No. 1. Long Island Brick Co.	2.30	3.50	8.15	28.52	58,000	128,100	4,492
8699	No. 2. Danvers	2.00	3.72	7.94	29.54	91,800	194,700	6,591
8670	No. 3. N. E. Steam B. Co. Rough Pav.	2.20	3.80	7.78	29.56	132,000	372,800	12,612
8701	No. 4. N. E. Steam B. Co. Smooth Pav.	2.20	3.51	7.78	27.31	177,000	383,900	14,057
8702	No. 5. N. E. Steam B. Co. Sewer Brick	2.25	3.90	8.00	34.20	114,000	282,600	3,263
8703	No. 6. N. E. Steam B. Co. Light Hard	2.40	4.16	8.33	34.65	67,000	159,100	4,592
8704	No. 7. Nyatt Brick Co.	2.28	3.58	7.29	28.35	98,000	209,900	7,404

I consider the above tables of great value to the building community. We are indebted to the enterprising firm of Norcross Brothers, who caused the above tests to be made, for much valuable information. By their great desire to know the strength of materials, and by the many precautions they take, they have gained an enviable reputation as being most *thorough* builders.

From exhaustive tests made during the building of the Allegheny County court house and tower, a most important work, the tower being three hundred and twenty-five feet high, something over one hundred feet higher than Bunker Hill Monument, it was ascertained that the strength of brick built in walls or piers is very nearly one third of the crushing strength when crushed between smooth surfaces or imbedded in plaster; so that, in work where it is necessary to be near the margin of safety, it may be assumed that well-laid brickwork will carry in a wall one third the crushing strength of a single brick. In some parts of the above-mentioned tower the brickwork carries twenty-four tons per square foot.

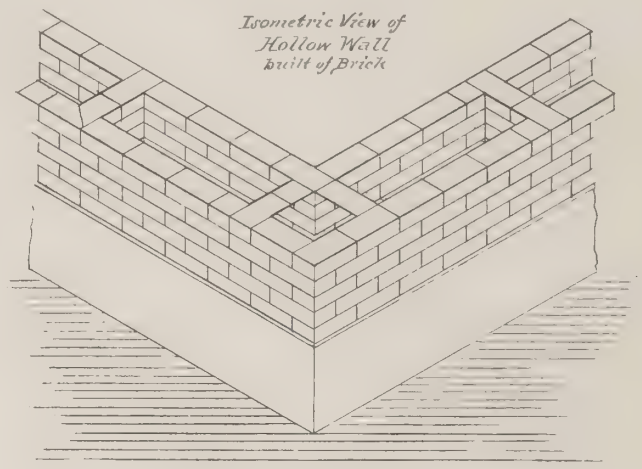
We also have other authority, taken from a book published by Frank E. Kidder, C. E., in 1892. On page 171 we find the following table: —

	STRENGTH OF MASONRY.
Brick (common) Eastern,	per square inch, 10,000
" (best pressed),	" " " 12,000
" (Trautwine),	" " " 770 to 4,600
Brickwork (ordinary),	" " " 300 to 500
" (good, in cement),	" " " 450 to 1,000
" (first-class, in cement),	" " " 930

Take, for instance, from the above table, "Brickwork (good, in cement)," using the lowest figures, 450 pounds per square inch. Assuming the weight of brickwork to be 112 pounds per cubic foot, it would require a brick column one foot square and 580 feethigh to crush the brick at the bottom.

Taking one brick $3\frac{3}{4}$ by 8 inches, which gives us a surface of 30 square inches, and multiplying this by 450, we have the sustaining strength, 13,500 pounds.

Now if we should lay one brick upon another to a height of 100 feet, we would have 500 brick with a weight of 2,000 pounds, thus leaving us 11,500 pounds to carry the load.



In a 16-inch hollow wall 10 feet long, laid with the solid bonded wyths of brick, 30 inches from centre we have 1,080 square inches of surfaces. Multiplying this by the lowest number of the seven Rhode Island bricks tested, 4,492, we have 4,851,368 pounds, or $2,425\frac{1}{2}$ tons, as our sustaining strength.

A hollow wall 10 feet long and 50 feet high contains 8,500 brick, with a weight of 34,000 pounds or 17 tons. Five hundred feet of flooring and roof at 25 pounds per square foot equals $6\frac{1}{4}$ tons; weight snow at 15 pounds per square foot equals $\frac{3}{4}$ ton; weight required by Boston ordinance for loading of floor, at 75 pounds per square foot, equals 15 tons; total, 39 tons. On deducting the 39 tons from the $2,425\frac{1}{2}$ tons, we have 2,386 tons of additional strength. This is certainly enough to make it secure beyond all doubt.

If, instead of using the 16-inch hollow wall, we had used a 12-inch solid wall of the same height and length, it would have required 2,570 more brick, giving us $5\frac{1}{2}$ tons additional weight on our foundations.

In using a hollow wall we gain many advantages, aside from the less weight and number of brick.

First. The hollow wall stands on a sixteen-inch base, while the solid wall has a twelve-inch base, making the former much the stiffer wall.

Second. We have a much dryer building, and one that is cooler in summer and warmer in winter; and frost will not appear on the inside of the wall, as is frequently seen on solid walls.

Third. The vacuum in the wall may be used to ventilate the cellar, and also to receive a pipe to conduct off the water.

This was done in the residence of the late George Crompton, of Worcester, Mass., and has never needed repairs.

Fourth. A hollow wall will stand fire much better than a solid wall.

This is shown in the Ashburnham Academy, where the entire woodwork was burned away, leaving almost the entire hollow wall standing erect.

In my practice as an architect I have built a great many buildings in which I have used the hollow wall. Some of these were very large and tall buildings, as the Congress Hall of Saratoga, N. Y., which is in part seven stories high. I have used this wall in many dwellings, schoolhouses, stables, and mills, all of which are standing as firm as the day when they were built.

All the above calculations are based upon good materials and good, thorough work. When these are obtained I claim that the hollow wall is much the best, and that buildings constructed with them are the most desirable to live in. I hope that the city authorities will soon change the ordinances so that we will not be compelled to put in more material than is necessary, to the injury of the building. I would rather pay for the extra brick and then leave them out, than to put them in; for the thicker the wall the longer it will retain the dampness.

A reliable architect made a statement before a city committee that he had seen a candle blown out through a solid brick wall twelve inches thick. In fact this was done before the Institute of Architects at Albany.

The apparatus used consisted of two tunnels placed one on each side of the wall. The connections were made thoroughly tight so that no air could escape. The candle was placed close to one, and some one blew in at the other. The candle was extinguished through twelve inches of solid brick. This experiment confirms the fact that dampness will penetrate a *solid* brick wall.

I have often asked the residents in houses built with the hollow wall, if it is ever damp enough on the inside to cause mildew or mould, or the swelling of the woodwork. This question has invariably been answered in the negative, thus proving the superiority of the hollow over the solid wall.

An example of this is seen in J. G. Clark's house in the city of Worcester, which has been closed and without fires for over a year. At the end of that time there was not the slightest appearance of dampness on the interior.

TERRA-COTTA PANEL.
F. M. Day & Brother, Architects.

TERRA-COTTA CAPITAL.
Carrère & Hastings, Architects.

WHAT THE SUBWAY IS.

(*See plates 95 and 96.*)

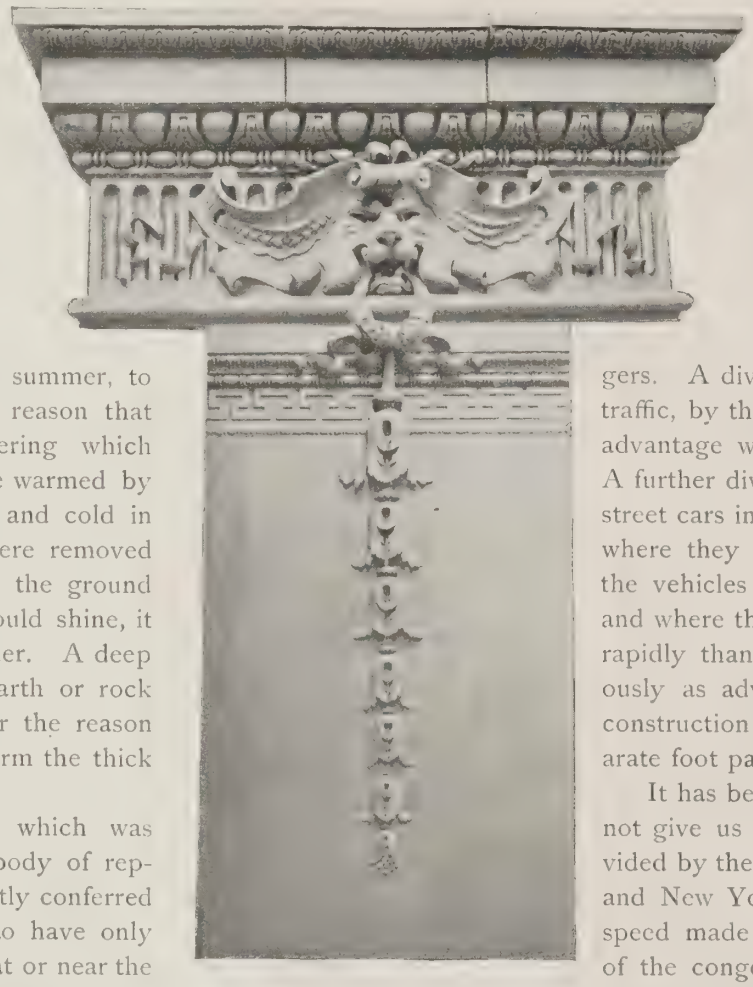
THE subway, authorized by chapter 478 of the acts of 1893, which it is proposed to build through Tremont Street, will consist of a trench fourteen or fifteen feet deep, wide enough to contain four parallel tracks, and covered over with a roof, upon which the pavement will be laid. There will be no openings upon the surface of the street, which will look just as it does now, except for the absence of railroad track and cars. One riding along the surface of the street might be totally unaware of the existence of the construction beneath. The subway will be lighted by electricity, and, if it is found necessary, will be ventilated by fans at each end, as is done in the new Baltimore tunnel. It is thought by some engineers that the cars moving through the subway, acting in a measure like so many pistons, will furnish sufficient ventilation without the use of fans.

The same cars, which beyond the congested district traverse the surface, will enter and run through the subway so that no change of cars will be required. They will doubtless make stops every two or three blocks, where the passengers leaving the cars may either enter the basements of the stores or go up a stairway coming out on the street. The height of the stairs will be much less than those of the elevated railroads of New York and Chicago, for the reason the ascent need be only as much as the height from the floor of the car to the roof, with a few inches for clearance at the top, plus the thickness of the covering of the subway, making a total of twelve or fourteen feet. The electricity can be taken from the trolley wire either at the side of the cars or beneath them, instead of from above as is done in the open streets. Every inch that is possible should be saved in the height of the stairways.

The proposed subway will differ from all tunnels or subways heretofore constructed, in that it will be light, bright, well-ventilated, and architecturally attractive; these features being rendered possible by the use of electricity

as a motive power instead of steam. The principal objection to the underground railways in London is caused by the smoke and gases of combustion, which vitiate the atmosphere and make the tunnel dark and dirty. It has been proposed that the walls of the Tremont Street subway be constructed of vitrified or porcelain brick, and that additional sidewalks be built beneath the surface, from which entrances may be obtained to the basements of the stores. Should this be done, it will afford an opportunity for show windows opening upon the subway, which, brilliantly lighted, will prove an attractive feature of the plan, and in effect will add a new story to all the buildings along the route. The subway will be comparatively warm in winter and afford a grateful coolness in summer. The engineers say that the change in temperature upon entering the subway will not be sufficient, even in the hottest days in summer, to give any one a chill, for the reason that the comparatively thin covering which supports the pavement will be warmed by the sun. A cellar is damp and cold in summer, but if the house were removed from above it, leaving only the ground floor upon which the sun could shine, it would be many degrees warmer. A deep tunnel with many feet of earth or rock above it is cold and damp for the reason that the sun's rays cannot warm the thick covering which is above.

The mayor's suggestion, which was fully approved by the large body of representative citizens who recently conferred with him on the subject, is to have only two tracks enter the subway at or near the junction of Tremont and Pleasant Streets, and to have all the tracks coming to Park Square enter a branch of the subway to be built under the Boylston Street mall. The subway would then contain four tracks from the junction of Tremont and Boylston Streets to the exit beyond Scollay Square, thus rendering it possible to remove all the tracks from the surface. The subway act wisely leaves the location of the exits from the subway, by which the cars will emerge to connect with the surface tracks, to the judgment of the subway commissioners. It provides that the subway shall extend through Tremont Street "from a point or points at or near the junction of Tremont and Pleasant Streets to Scollay Square, and may continue through Court Street or other streets and lands near Scollay Square to a point or points where, in the judgment of said board, a suitable and advantageous exit to connect with surface tracks may be obtained." Under this act the subway might be continued well down toward the northern stations, if in the judgment of the subway commissioners it should seem best. The mayor has stated that in his opinion the cost of the subway would be less than the expense of widening Tremont Street, but the advantage of the subway in the way of accommodations to the people would be far greater than doubling the width of the street, for it would make a two-story street and segregate the traffic, placing the street cars in one portion of the street and the travel by vehicles in another, so that they could not possibly conflict with each other.



TERRA-COTTA DETAIL FROM HOTEL WALDORF.

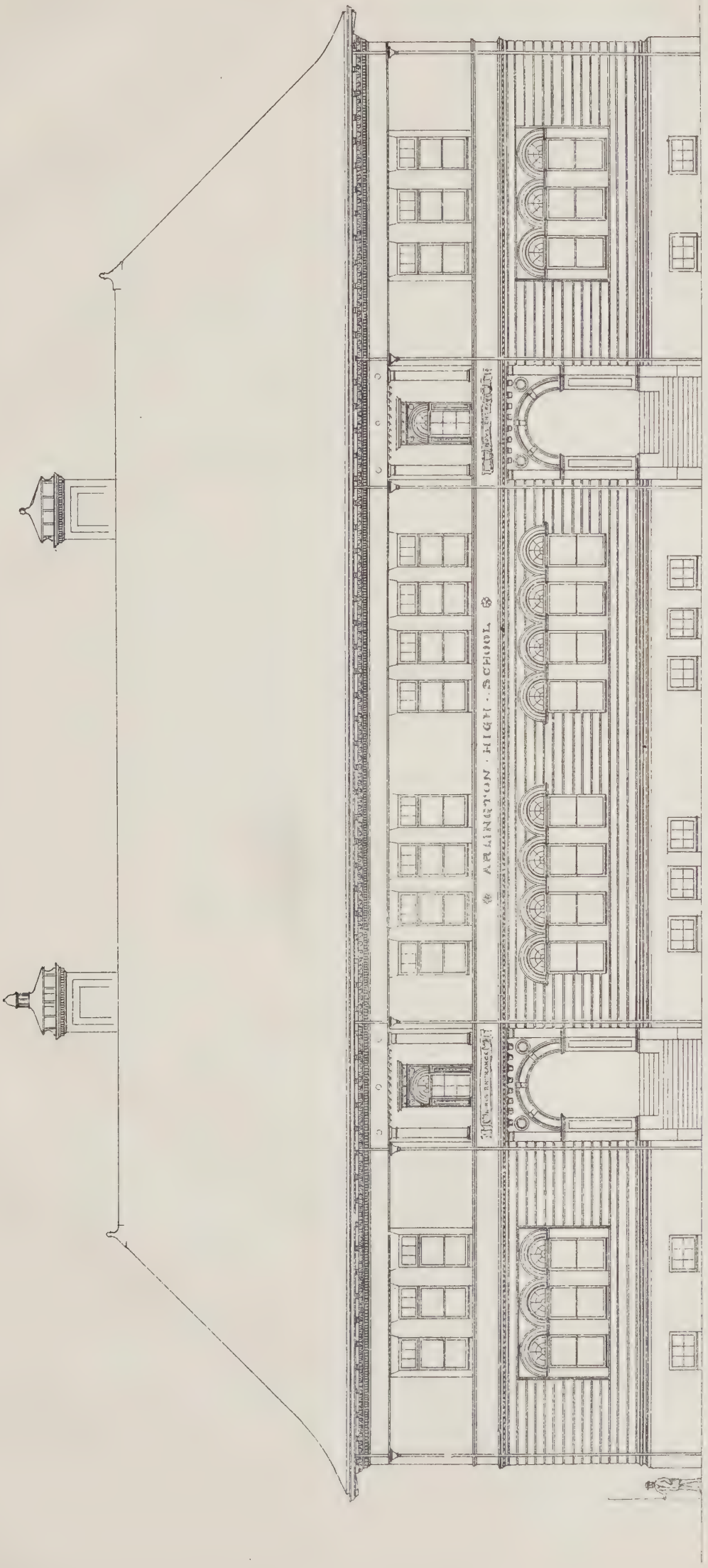
H. J. HARDENBERG, ARCHITECT.

In some of the old cities of Europe busy streets may still be seen without sidewalks, the pedestrians being mixed indiscriminately with the vehicles. The result, of course, is a detention of carriages, which are unable to proceed faster than a walk, and a danger to foot passengers. A division of the foot and carriage traffic, by the adoption of sidewalks, is an advantage which is clear to every one. A further division of the traffic by placing street cars in a lower story of the street, where they cannot possibly conflict with the vehicles or run down foot passengers, and where they may proceed much more rapidly than upon the surface, is obviously as advantageous in its way as the construction of sidewalks in order to separate foot passengers from the vehicles.

It has been said that the subway will not give us rapid transit as is now provided by the elevated railroads in Chicago and New York, but the fact is, that the speed made by our electric cars outside of the congested districts of the city is nearly or quite equal to the speed of the elevated trains in those cities. It is in the congested district that the delay occurs. The facilities afforded by the four-track subway will remove the cause of these delays, at least upon Tremont Street, and it is confidently believed that this improvement will be so popular that eventually the subway will be built under Washington Street, and perhaps in other thoroughfares. — *Boston Transcript.*

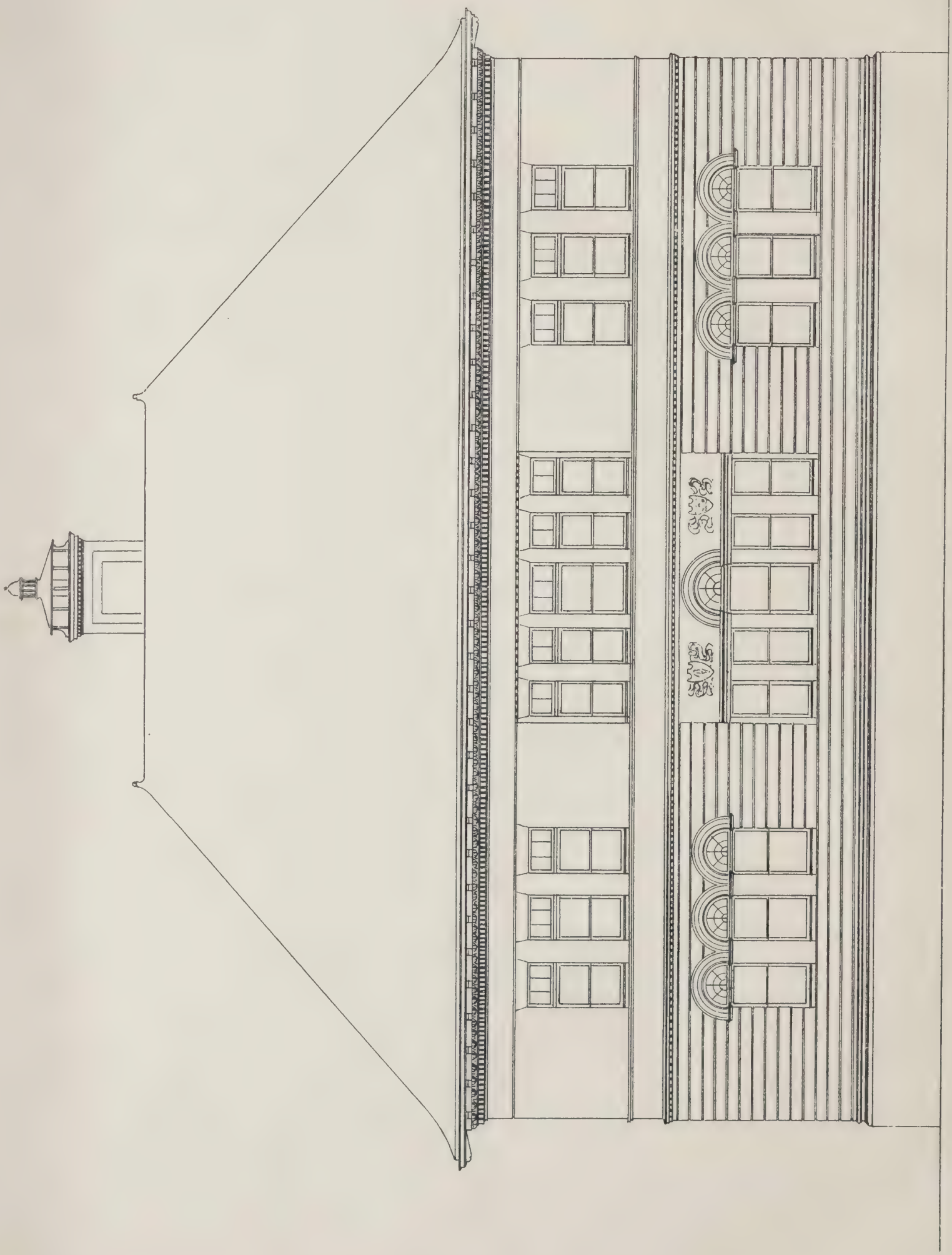
A FEATURE OF 1894.

ONE of the interesting features of THE BRICKBUILDER will be the reprinting of Mr. G. E. Street's "Brick and Marble in the Middle Ages," a work now out of print and very hard to buy. The brick and terra-cotta work takes so large a portion of this famous book that it is distinctly within the field of this paper. Besides the numerous illustrations in the original work, a vast number from photographs and sketches will be added in reprinting.



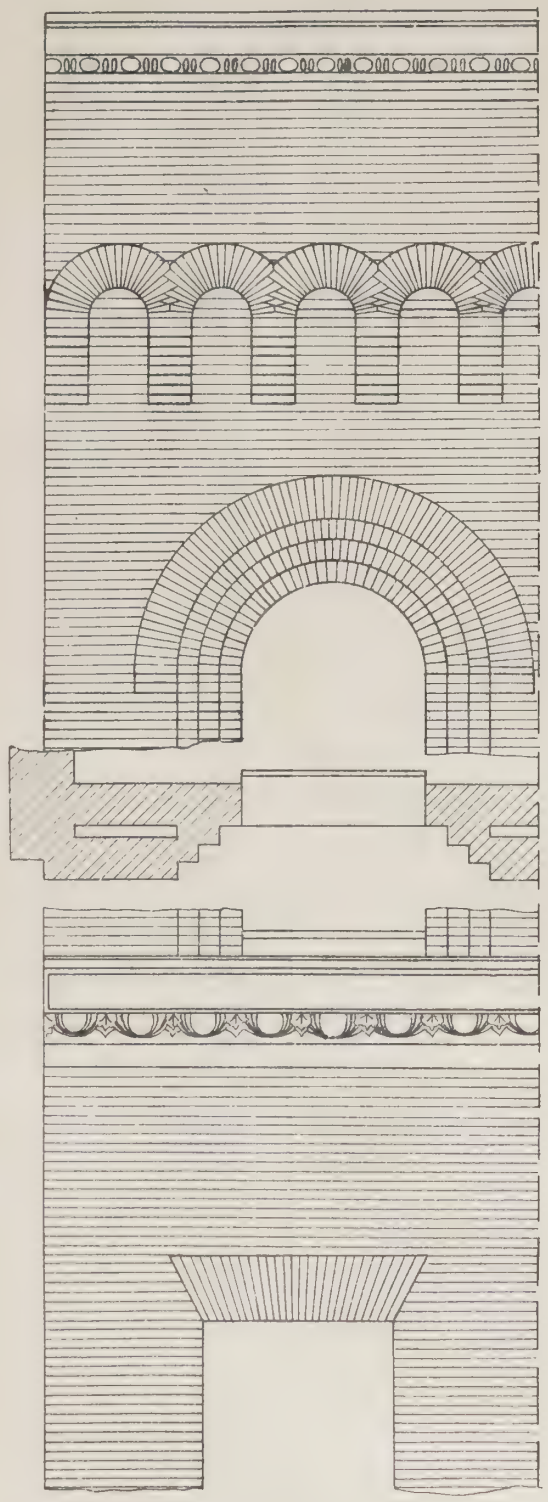
COMPETITIVE DESIGN FOR ARLINGTON HIGH SCHOOL; MAIN ELEVATION.

H. LANGFORD WARREN, ARCHITECT, BOSTON.



COMPETITIVE DESIGN FOR ARLINGTON HIGH SCHOOL; END ELEVATION.

H. LANGFORD WARREN, ARCHITECT, BOSTON.



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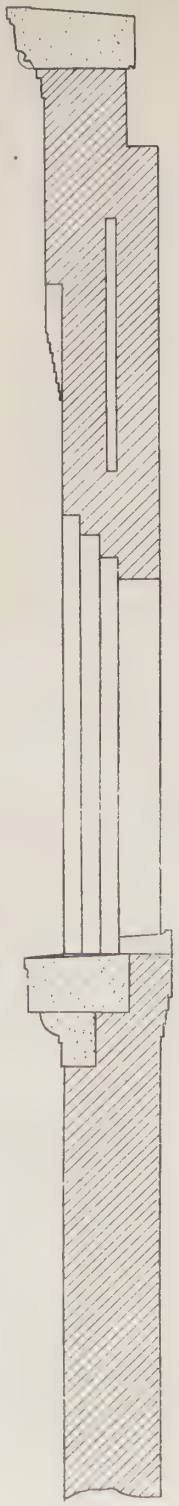
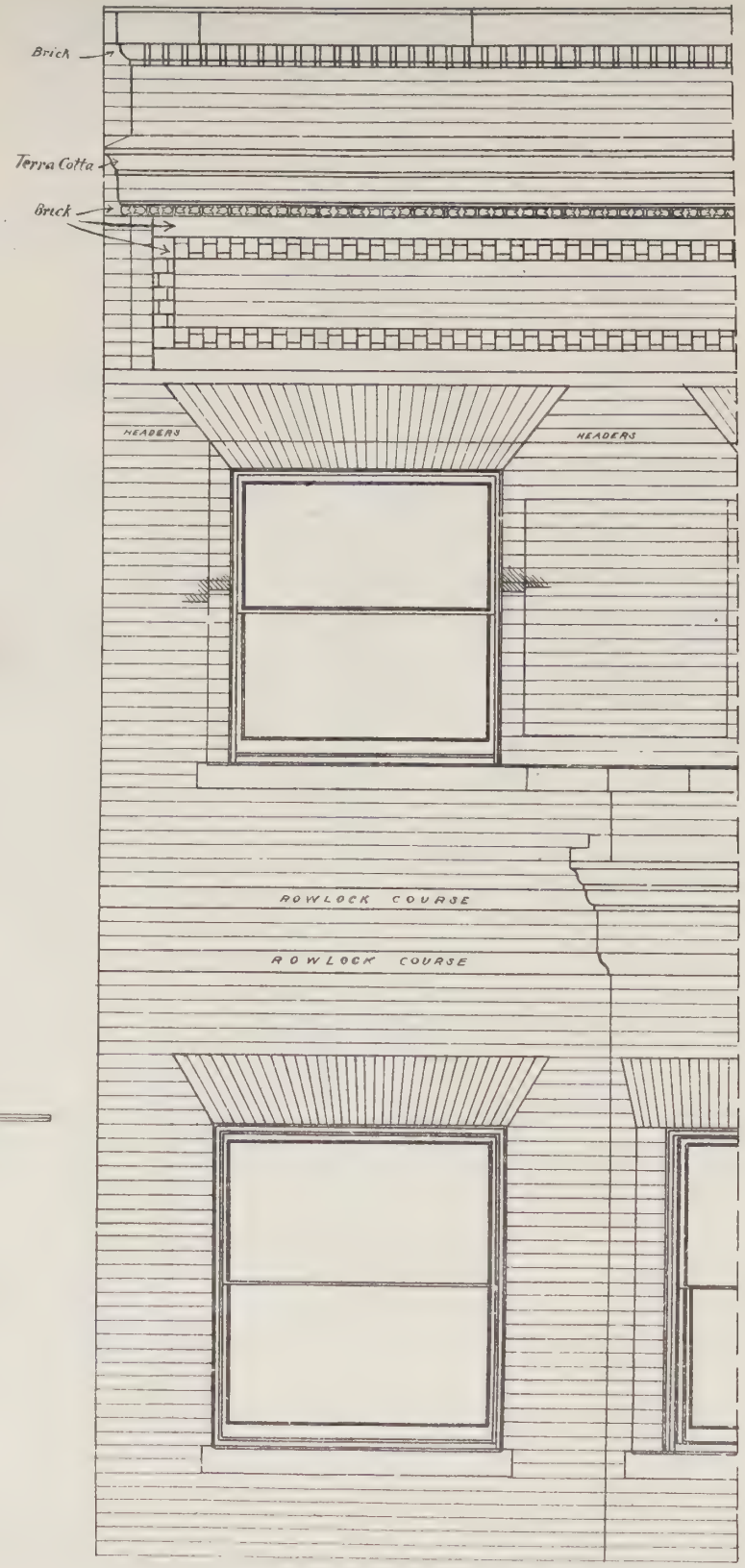
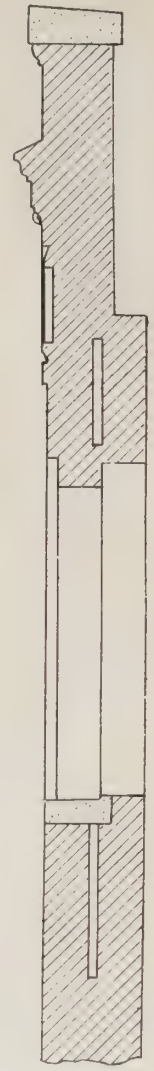
·DR·JAMES·B·AYER·







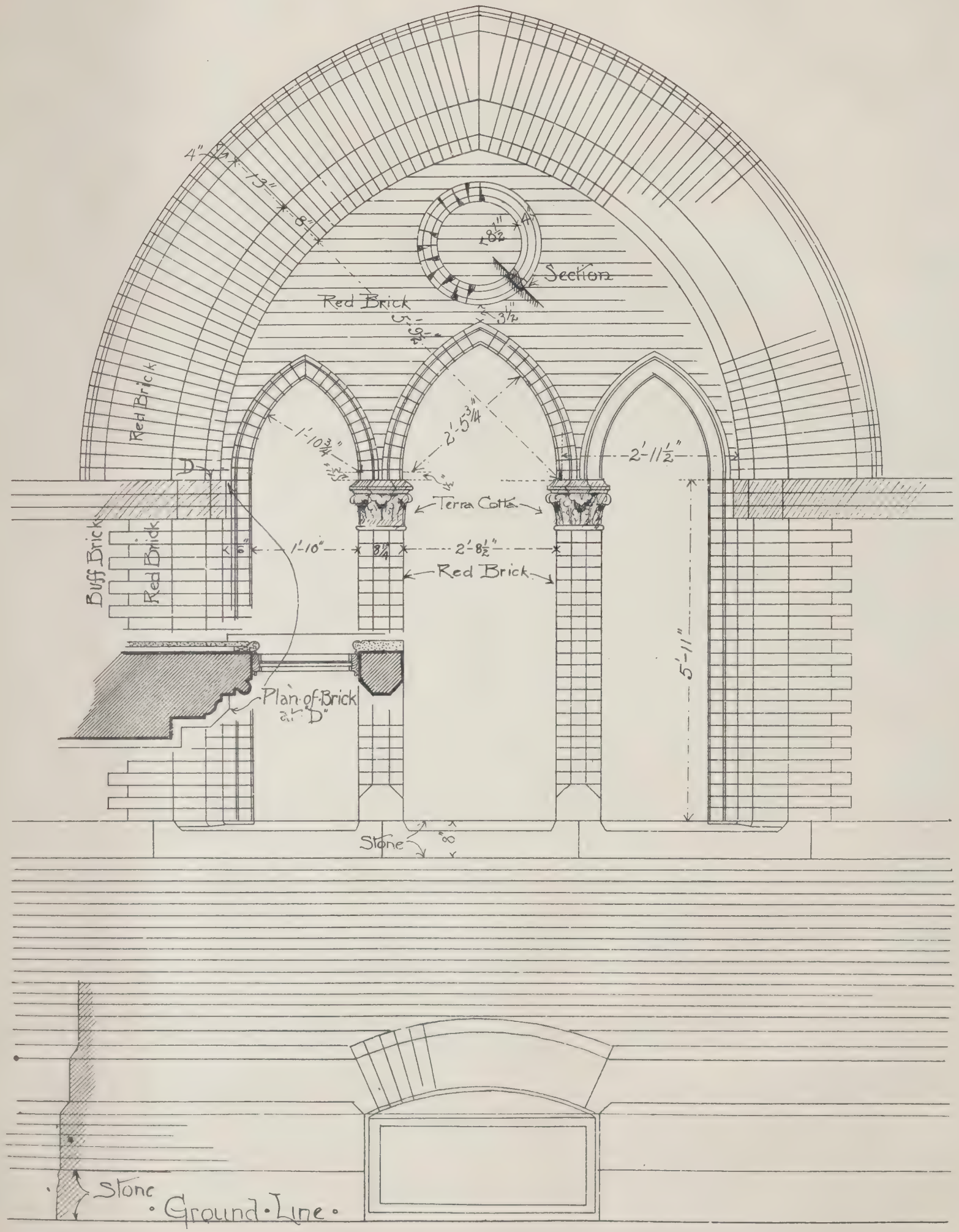
·HOVSE·FOR·
DR·HAROLD·WILLIAMS·

DETAILS OF BRICKWORK; RESIDENCES ON BEACON STREET, BOSTON.

MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON.

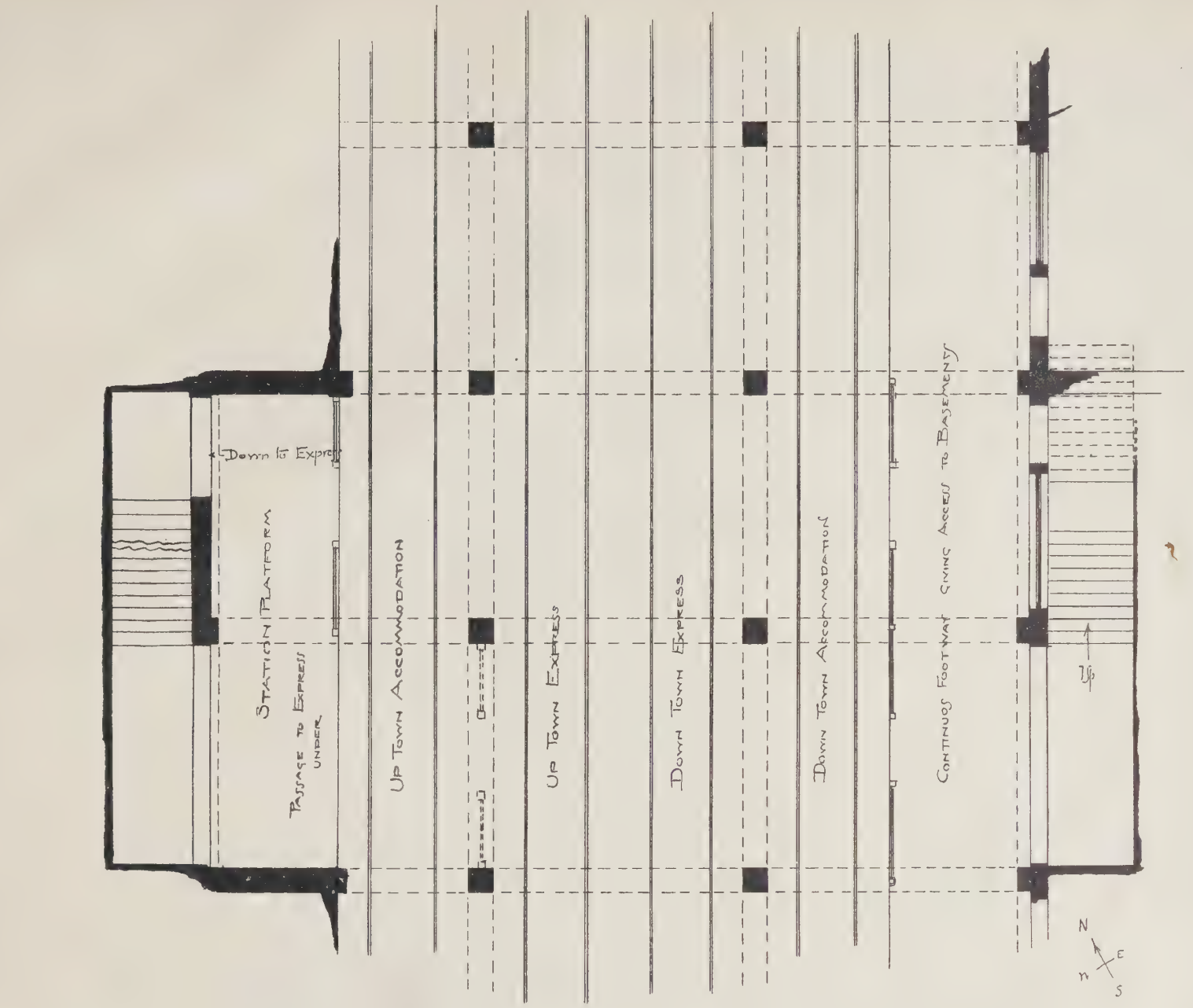
CALVARY CHURCH PARISH HOUSE, PITTSBURGH, PA.

FRANK IRVING COOPER, ARCHITECT. BOSTON AND PITTSBURGH.

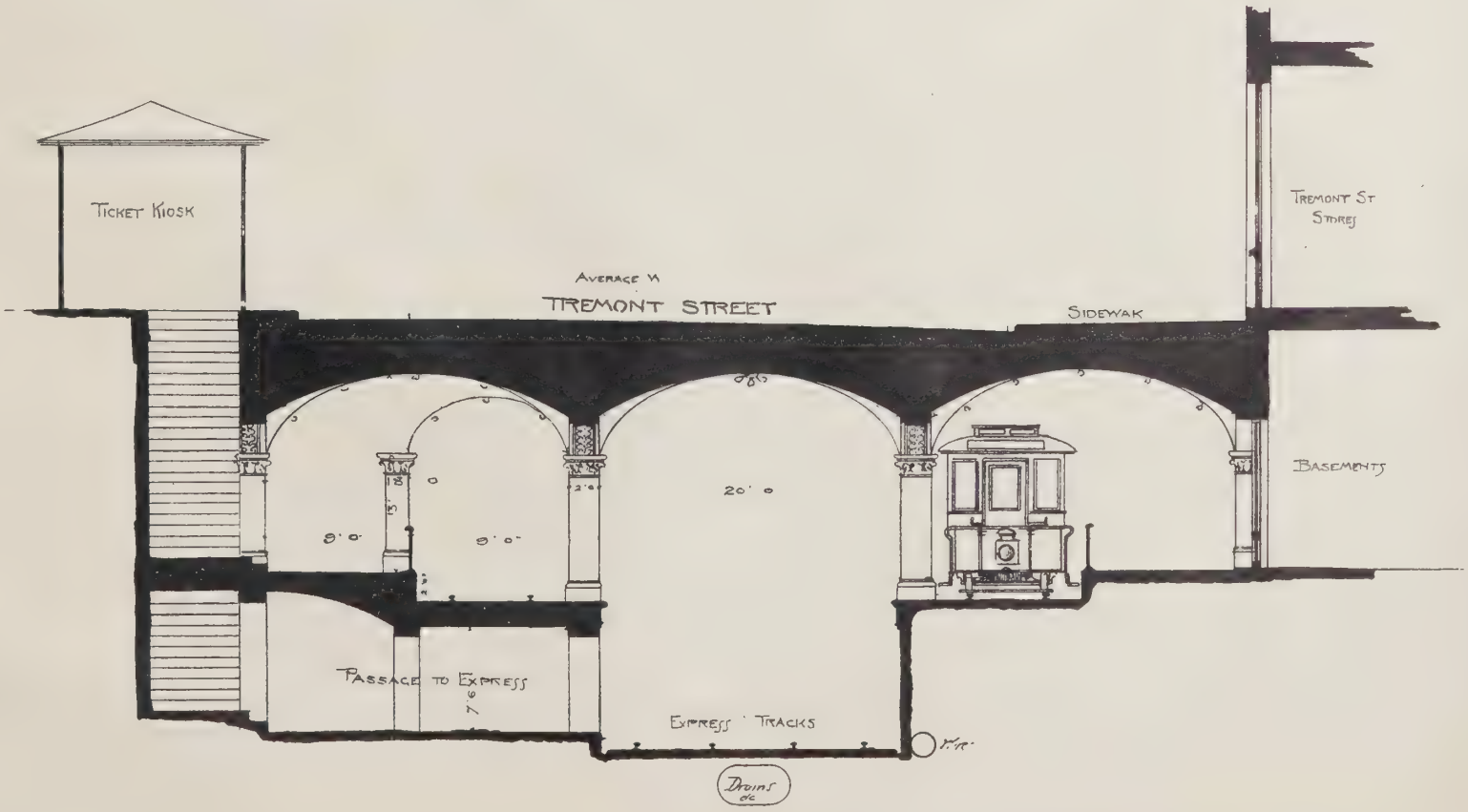


DETAIL OF BRICK WINDOW, CALVARY CHURCH PARISH HOUSE, PITTSBURGH, PA.

FRANK IRVING COOPER, ARCHITECT, BOSTON AND PITTSBURGH.

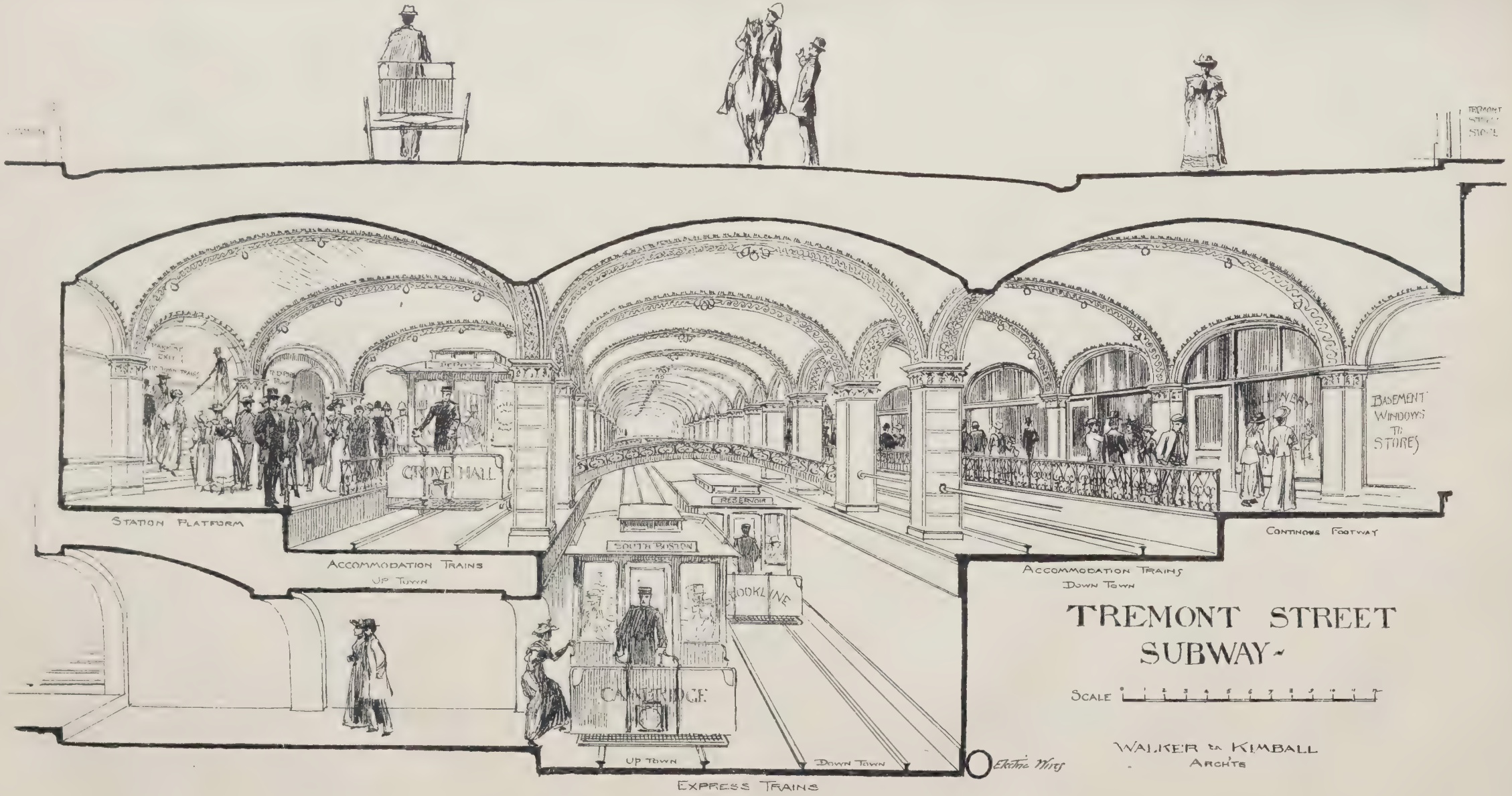


PLAN



PROPOSED TREMONT STREET SUBWAY, BOSTON.

WALKER & KIMBALL, ARCHITECTS, BOSTON AND OMAHA.



PROPOSED TREMONT STREET SUBWAY, BOSTON.

WALKER & KIMBALL, ARCHITECTS, BOSTON AND OMAHA.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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PUBLISHERS' STATEMENT.

No person, firm, or corporation, interested directly or indirectly in the production or sale of building materials of any sort, has any connection, editorial or proprietary, with this publication.

WITH this, the closing number of the second volume of THE BRICKBUILDER, we wish to thank our subscribers and advertisers for the patronage they have extended to us, and to say that during the coming year we will make every effort to doubly merit the continuation of that patronage. It is impossible in a paper of this class to give a detailed prospectus covering the year to come, as many things come up during the course of a year to change the best-laid plans. We can only give a general outline of the work we will do, with one exception, —that of the department to be devoted to fireproof construction, a tolerably complete prospectus of which is given below.

THE BRICKBUILDER will be more than doubled in size during 1894, and it will have the largest and best corps of contributors of any American architectural periodical published. Special attention will be paid to constructive methods, and to plain and decorative brickwork. Limes, mortars, cements, roofing tiles, and fire-proofing will all come in for careful consideration, it being the purpose of the paper to entirely cover the use of building materials made of clay. More attention than formerly will be paid to the illustration of the paper; the lithographic plates will continue to be an important feature, which, with the use of photographs and sketches in the letter-press, will cover all meritorious new work, wherever built. Practical features, such as market reports and trade notes, will also be inserted in the proper place, care being taken that these shall be absolutely correct and up to date.

DURING 1894, THE BRICKBUILDER will take up the matter of fireproof construction in a manner never before attempted by any journal in this country. The plan adopted is alike intelligent, broad, and aggressive, and can hardly fail to be far-reaching and effective in results. That the subject is one of national importance it is unnecessary to state, yet as a nation we are strangely indifferent to it; and the effort of THE BRICKBUILDER will be to awaken interest to a point where results will follow.

The building laws of our great cities will be in turn critically reviewed, faults pointed out, and improvements suggested. Modern construction, in a strict sense of the word, will be exemplified, while defective, out-of-date methods will be dealt with in an unvarnished manner. Such matters as proper floor areas, incombustible walls, floors, and partitions, efficient shutters, automatic sprinklers, roof hydrants, stairways, and elevator wells — in brief, every modern idea upon fireproof construction or looking to improvement of buildings already erected — will be successively dealt with in THE BRICKBUILDER. The matter is too important to be alone treated by our editorial force, and, with full knowledge of this fact, assistance has been secured from some of the leading authorities in the country. Mr. Osborne Howes, Jr., of Boston, the widely known and widely quoted secretary of the Board of Underwriters; Mr. B. B. Whittemore, ex-president of the same; Mr. Charles W. Whitcomb, for seven years fire marshal of Boston; Mr. William J. Gillingham, chief of the Bureau of Building Inspection, Philadelphia; and Hon. Nathan Matthews, Jr., mayor of Boston, will deal in their contributions with the practical side of the problem; while Prof. N. S. Shaler, dean of the Lawrence Scientific School of Harvard University, and Mr. Edward Atkinson of Boston, will treat the scientific and theoretical sides of the question. The highly important matters of fireproof dwelling-houses and corporation houses will be taken up and richly illustrated, and, as the co-operation of some of the most influential daily journals of this country has been tendered, THE BRICKBUILDER'S efforts promise to be highly successful in every way.

MR. ROBERT D. HUFF, secretary of the Board of Building Inspectors of Detroit, has favored us with a copy of the building laws of his city. Mr. Huff writes that important amendments on construction are now before the Common Council, which will probably give Detroit modern ordinances. The recent disastrous fire in that city should expedite matters.

Philadelphia, too, is slowly moving in the right direction, and proposed ordinances, to accord with the new State law for cities of the first class, are before the Council; yet with these on the statute books the Quaker City's laws will still permit the erection of buildings which a live town of 10,000 inhabitants would forbid within its precincts. An hotel of comparatively small area, eight or more stories in height, is rapidly approaching completion in Philadelphia, which almost seems designed to be a constant menace to life and property. With walls of brick, wooden floors and floor supports, wooden partitions and wooden roof, small area and considerable height, the structure would become a veritable chimney in case of

fire. A fire, like that which recently occurred in the basement of the Metropole, in Philadelphia, would be likely to go through the roof.

The supineness regarding construction in many of our Eastern cities is but little short of criminal. One has to go to Chicago to observe correct popular ideas of what is right and safe in the way of construction, and to find an embodiment of them on the statute books.

THE seventh annual report of the fire marshal of the city of Boston, Mr. Charles W. Whitcomb, at hand, is highly instructive and interesting. Mr. Whitcomb reports that the total fire loss during the year ending May 1, 1893, in the city of Boston, amounted to $5,542,900.47, "a sum which, had it been saved, would have been sufficient to meet one half of the entire tax levy of the city." One important point mentioned is the uniformity with which the principal causes of fire, such as spontaneous combustion, electricity, defective construction, rats and matches, carelessness with matches, and lamp explosions, retain their several percentages year after year with scarcely any variation. Another is the lesson learned from Boston's recent destructive conflagrations which, briefly summarized, call for smaller floor areas, incombustible partitions, automatic sprinklers, roof hydrant service, smaller windows in lower stories, improved shutters, with a trained force to guard them, fireproof stairways and true mill construction, with all combustible connection between floors eliminated. THE BRICKBUILDER is very fortunate in having secured Mr. Whitcomb to present to its readers, during 1894, a series of articles which will give his views on fireproof construction gained by years of practical experience and observation as fire marshal of Boston.

The fire loss in the United States for the month of November was $11,493,000. — *Fire and Water*.

Adding to the above loss of human life, and indirect as well as direct loss of business and property, the result carries with it a suggestive moral on construction of considerable weight for a single month.

THE drawings for the Boston subway, published in this number, were made to show the possibilities of attractive interior treatment, more than to define the actual method of construction or of arrangement of tracks.

By the use of faience, and grouping of electric lights, and also with the attractive feature of basement store fronts, the subway can be made a very effective piece of architectural as well as of engineering work. It is seldom that a long vista of piers or columns is possible in modern work, and it needs but a memory of the Hall of a Thousand Columns at Constantinople, or the aisles of the Mosque at Cordova, to convince that such an opportunity could and should be thoroughly well treated. In another column we reprint a very good description taken from the Boston *Transcript* of what the subway is, or, rather, may be.

THE November number of the Chicago *Clay Journal* devotes above three columns of valuable space to an impeachment of the *Brickmaker* of Chicago and Mr. Charles T. Davis, which seems to call for attention both in the trade and in trade journalism; for the charge is of serious false pretence as to the circulation and standing of Mr. Davis's journal. We observe the matter with a feeling of decided regret, — regret that there has seemed to any one "probable cause" for the very severe arraignment, and regret that such a matter should arise in the family of trade journals, for its effects cannot be otherwise than pernicious.

Though far from our object to discuss the merits and demerits of the *Clay Journal's* case, — we fancy both may be seen, — the incident demands our notice, and furnishes food for serious reflection. This great country of ours, vast in area and in the importance and diversity of its industries, furnishes opportunities for much in journalism that is illegitimate, not to say dishonest; and not alone in trade journalism. Sad to state, but none the less true, opportunities of this sort are not wholly neglected. It is this condition of affairs that has taken the very life out of the meaning of "circulation" in a journalistic sense, that has been more disastrous to young enterprises in the field of journalism, however great their merit, than any other one thing, and that has made sceptical and distrustful the business public, whose co-worker a journal should be.

Here and there, from time to time, arise sporadic journals covering nearly every feature of our social life, too many of which reflect nothing but discredit upon the profession and upon themselves. Existence lasts while dishonesty remains yet undiscovered; confidence is outraged, and its contributions fatten the purse of the betrayer; an exposé inevitably comes, and with it discredit upon a profession which, honestly and legitimately conducted, is as necessary, as self-respecting, and as commendable as any profession in the land.

Honest purpose has enough to overcome without having such obstacles thrust into its path. Let trade journals of the country unite in a purpose to set foot upon any parasites in their midst, and in a determination to maintain the high standard of honor and integrity which is their life, and upon which depends their existence, material and beneficial.

We hope, for the sake of the *Brickmaker* and its profession, that its arraignment may prove to have been overdrawn.

The editor of *Printers' Ink* estimates that the annual expenditure in this country on account of advertising is not less than $200,000,000. The amount of money realized from this outlay comes very close to being the total amount of money that is made in all the business that is done in this country. The business of people who do not advertise does not count. It is infinitesimal compared with those who do. — *Boston Herald*.

WE do not believe that the "funny" column is a legitimate part of a trade journal, and have as a matter of principle carefully avoided anything properly within the province of *Puck* and *Judge*, in the past; but the temptation to reprint the following modest announcement of an esteemed contemporary is too great to be resisted in spite of our principles.

"This popular and widely circulated, illustrated scientific paper is devoted to all branches and systems of the manufacture of brick, architectural terra-cotta, porous terra-cotta, terra-cotta lumber, hollow tile fire-proofing, composition fire-proofing, and all other systems of fire-proofing. Sewer pipes, drain tiles, fire bricks, gas retorts, and other fire-clay products. Stone-wares, porcelains, and pottery ware of every kind. Descriptive articles of all useful inventions, new discoveries and processes; new application of fuel and gases; improvements in clay-working and other machinery; elevator conveyor and labor-saving systems; burning kilns, calcimining kilns, drying kilns, and apparatus for clay wares, cement, gypsum, and general appliances.

"Details, plans, and suggestions for construction of manufacturing plants, reports on new discoveries of clay, mineral and fuel deposits. Subjects of science and art, embracing chemistry, electricity, heat, light, technology, mineralogy, geology, biology, archæology, mining, hydraulic, civil, sanitary, steam, and mechanical engineering, architecture and law; statistical reports, labor rates, selling prices of building products, editorial comments on leading subjects, current news, and a vast amount of valuable general information."

THE brick works recently established in the suburbs of Baltimore, on the Philadelphia Division of the Baltimore & Ohio Railroad, by Richard Cromwell & Co. (office, corner Lombard Street and Cheapside, Baltimore), are meeting with marked success. They have an excellent location and an abundance of clay. They can ship by rail into the city, and compete with the factories where the transportation is by team. They produce a fine quality of brick, and we predict a bright future for their works.

SINCE the McKinley tariff bill became a law eleven plants for the manufacture of enamelled brick have been established in this country, and the cost of this brick has been reduced ten to fifteen dollars per thousand. "Is the tariff a tax?" Domestic brains and competition are even yet an element in our political economy.

THE new Philadelphia law applying to theatre construction is patterned upon that of the city of Boston.

NO building in Boston has attracted more attention of late years than the Carter Building on Water Street, between Washington and Devonshire Streets. Its location in the busiest part of the city, its unusual shape, the novelty of its construction (being the first steel frame office building in Boston), and its color contrast to the surroundings, have drawn to it attention that a building seldom gets. It is, we believe, the first important Boston work in which the Hydraulic-Press bricks have been used, these coming from the Eastern Hydraulic-Press Brick Company, Philadelphia. The terra-cotta is furnished by the Boston company. Mr. C. H. Blackall is the architect.

THE enterprize of the F. D. Cummer & Son Company of Cleveland, in soliciting and securing a recent English contract for a pottery clay drying plant, deserves more than passing attention. It again illustrates the capabilities of American enterprize, and suggests food for thought in these dull days.

ANTHONY ITTNER of St. Louis has always given careful attention to the homogeneous character of his bricks, and the importance of this quality in a brick should not be overlooked. The waste in cutting is so small that out of a lot of fifty thousand shipped from his Belleville (Ill.) factory to the New Harmony (Ind.) Workingmen's Institute, the fragments did not make more than an ordinary barrow load.

THE firm of Pellegrini & Castelberry, operating the Southern Terra-Cotta Works at Atlanta, has been succeeded by the firm of Pellegrini, Hunerkopf & Fugazzi, who purpose greatly increasing their facilities for the production of terra-cotta, fire proofing, Spanish and German roofing tile, wall coping, chimney caps, flue linings, etc. Mr. Pellegrini will have personal supervision of the artistic work.

THE famous Anson Phelps Stokes house, at Lenox, Mass., is roofed with the Celadon "Conesera" tiles, three hundred and eighty-three squares being used.

THE White Brick and Art Tile Company has secured a contract that will test the capacity of its plant for some months to come, on the new St. Luke's Hospital in New York, of which Mr. Ernest Flagg is the architect.

A NEW FIREPROOF FLOOR.

JOSEPH MELAN, a professor at the Imperial Technical High School, Brunn, Austria-Hungary, has patented in this country a system of flooring construction which, while not in the line of clay building materials, comes within the field of fireproof construction, which will take a prominent place in our columns during 1894. We will not attempt at this point to consider the merits or demerits of the system, contenting ourselves with as clear a description as possible and a statement of the inventor's principal claims.

The system comes under the general classification of concrete filling on an arched form, between iron girders. Between these girders, iron ribs of I or T iron, curved to conform to the intrados of the arch, are placed, the ends either being finished to fit closely against the girder, or held tightly by iron wedges. After the framework of girders and cross ribs is constructed, centres are put up and a filling of rammed concrete is put in, covering the sides of the ribs and forming between them a shell, of the thickness of the height of the ribs. The portions of the girders projecting above this are then covered with rammed concrete, and a light filling put in to bring the surface of the floor above the top of the girders, and on this filling the flooring is constructed.

Prof. Melan claims that his method produces both the strongest and the cheapest fireproof floor. He bases his claim for strength upon comparative tests by the Austrian government under the direction of the Austrian Society of Engineers and Architects. All manufacturers were allowed to build their systems of flooring under the superintendence of a board, consisting of representatives of the principal railroads, builders, and colleges, the span being uniformly 13½ feet. The results of the arched flooring are given below: —

TABLE OF TESTS.

Kind of arch tested.	Span. Feet.	Rise. Inches.	Thickness in apex. Inches.	Amount of steel in lbs per sq ft.	Breaking load, lbs. per sq ft.
Brick, with cement mortar....	$13\frac{1}{3}$	$15\frac{3}{4}$	6	....	321.5
Concrete....................	$13\frac{1}{3}$	$15\frac{3}{4}$	4	....	737.3
Monier arch (wire netting)...	$13\frac{1}{3}$	$15\frac{3}{4}$	$2\frac{3}{8}$	8.0	839.7
Melan arch (I beams)	$13\frac{1}{3}$	11	$3\frac{1}{8}$	1.4	336.0

The arch here constructed was estimated to bear a dead load of 50 lbs. and a live load of 150 lbs. With a factor of safety of 5, the arch would then carry 1,000 lbs. per square foot. The breaking load was over 3,000 lbs., giving a factor of safety of 15.

As regards cost, Prof. Melan estimates the average cost of an 18-foot span as follows: —

1. A hollow tile floor and 100 lbs. live load have (see Carnegie Steel Co.'s blue print) 4.7 lbs. steel per square foot, including connections, a pound steel: 1.75 c plus punching 0.25 = 2.0 c, makes, 9.4 c
2. A hollow tile floor and 200 lbs. live load have per square foot 6 lbs. steel 2.0 c .... 12 c

Beams are supposed in both cases 6 feet apart. They are, it may be remembered, the lightest and consequently, so far as regards the steel beams, the cheapest floor of that kind.

3. Melan arch 5-inch I beams, 10 lbs., 40 inches apart, have $2\frac{1}{4}$ lbs. steel per square foot. The mill furnish them bent and cut at a price of 2.25 c, makes.................................... 5.0 c

A similar result is obtained by comparison of the concrete body 5 inches thick with the tile arch 10 or 12 inches thick.

Within a year since the patent was granted, nearly one million square feet of this floor have been built in Austria. Concrete floors in the United State have heretofore been confined largely to places requiring a waterproof floor, as breweries, etc., on account of the heavy and clumsy form in which concrete arches have been built. Prof. Melan holds that the hollow tile system should be used only for comparatively light loads.

PATENTS.

For month ending Dec. 20, 1893. Reported by Hugh M. Sterling, attorney-at-law, Washington, D. C.

Brick Kiln. Carl Moellenhoff, Hamm, Germany.

Brick Machine. Emil Fernholtz, St. Louis, Mo.

Composition of Brick and Making Same. Thomas A. Edison, Llewellyn Park, N. J.

Brick Machine Separator. Thomas B. Campbell, Ithaca, N. Y.

Pug-Mill. Thomas B. Campbell, Ithaca, N. Y.

Gutter Brick. James P. Gaffney, Cumberland, Md.

Brick Kiln. Philip Gonder, Canton, O.

Continuous Brick Kiln. James Henney, Cloverport, Ky.

Brick Machine. David P. Guise, Williamsport, Pa.

Brick Machine. Henry Martin, Lancaster, Pa.

Brick Machine Attachment. Samuel J. Van Stovoren, Philadelphia, Pa.

Brick Machine Reciprocating Cot Off Mechanism. Oliver W. Johnson, assignor to J. W. Penfield & Son, Willoughby, O.

Brick Mould. Carl F. Kaul, Madison, Neb.

Brick Drier. Isaac Stripe, Greentown, O.

Brick Machine. John J. Whittaker, Accrington, England.

Brick Kiln. Downdraft. Lewis H. Rippell, Kansas City.

Fire Brick or Slab. Charles Olsen, New York, N. Y.

Brick Kiln. John Gaffney, Atkinson, Kan.

Brick Mould. Charles A. Shultz, Rondout, N. Y.

AS OTHERS SEE US.

F. J. MARDEN, Contractor, Brockton, Mass.: "I am very anxious to receive the copies, as I like the paper very much."

HENRY WORTHMANN, Architect, Chicago: "I am well pleased with the paper, and would like the full volume in order to bind it."

N. M. ISHAM, Architect, Providence: "I enclose check for renewal of my subscription to your excellent paper, which I would not be without."

WILLIAM B. ITTNER, Architect, St. Louis: "THE BRICKBUILDER I value as much as *The American Architect*, and am positive your efforts will be crowned with success."

WILLIAM MARTIN AIKEN, Architect, Cincinnati: "I am always glad to receive and preserve THE BRICKBUILDER. Wishing you still greater success in the future," etc.

M. S. MAHURIN, Architect, Fort Wayne, Ind.: "The paper pleases me very much, and I trust not only its good qualities will be kept up, but that we will have it in our hands more regularly."

FRANK WALLER, Architect, New York: "I wish you the success you deserve, as I know of no journal that occupies the field you aim to cover; so you may continue my subscription."

GEORGE T. TILDEN (Rotch & Tilden), Architect, Boston: "I am so pleased with the copy of your journal just received that I want to take advantage of your offer on page iv, and accordingly enclose five dollars for same."

GEORGE W. WRIGHT & CO., Architects, Niagara Falls, N. Y.: "Four numbers of THE BRICKBUILDER have just arrived, with which we are very much pleased. I can assure you no publication receives a more hearty welcome to our office than this."

Prospectus for 1894.

With new and commodious offices, entire new equipment, a more than doubled working force, and the experience of two years, THE BRICKBUILDER enters upon its third year in a position to carry out in every detail the programme herewith submitted for consideration.

The character of the paper as already established has been too warmly endorsed by subscribers to admit of any radical change, therefore our efforts will be devoted to giving a larger quantity and greater variety of the same kind of material that has proven so acceptable for the past two years. The lithographic plates which have occupied so important a place will be continued, at least eight appearing in each issue, these being chiefly devoted to careful scale or working drawings of the best modern work. It is in the line of the letter-press and its illustrations that a great advance will be made.

Original articles, fully illustrated, embracing among other subjects Constructive and Decorative Bonds in Brickwork, The Brick Towers of Rome, The Artistic Treatment of Small Brick Houses, Brick as a Material for Fine Churches, Early Moulded Brickwork in Washington, etc., etc., will be contributed by prominent architectural writers.

Quarterly letters profusely illustrated with photographs and sketches will enable us to keep pace with the current work in brick and terra-cotta, in all the principal cities of the country. These letters will deal with buildings of general interest, reserving those that are of special interest for a separate series of articles, which will be regularly published, one devoted to each building, fully describing it and illustrating all its details.

Two famous books, now out of print, will be reprinted in our columns during 1894: the first, George Edmund Street's work upon the brick architecture of Northern Italy, with its original illustrations supplemented by an equal number of new ones, from photographs and sketches; the second, an authoritative work on brick and concrete construction, a translation of Auguste Choisy's "L'Art de Bâtir chez les Romains," with 100 illustrations in the text and twenty-seven full-page plates. These two features are fully worth the subscription price to every architect and draughtsman.

The cause of building for better protection against fire will be taken up as an important special department, in a manner never yet attempted by any publication. Writers of national reputation, among whom we may now mention Mr. Osborn Howes, Jr., Sec'y of the Boston Board of Fire Underwriters, Mr. B. B. Whittemore, Ex-Pres. of the same, Mr. Charles W. Whitcomb, for seven years fire marshal of Boston, Mr. William J. Gillingham, Chief of the Bureau of Building Inspection of Philadelphia, Hon. Nathan Matthews, Jr., Mayor of Boston, Mr. Edward Atkinson, and Prof. N. S. Shaler of Harvard University, will treat of the methods of fireproof construction and such connected subjects as proper floor areas, efficient shutters, hydrants in buildings, stairways and elevator wells, automatic sprinklers, fire escapes, etc. The buildings laws of the principal American cities will also come in for attention and comparison with each others, and with those of European cities.

A regular department will be devoted to details for the ornamental use of common brick, and this will be made a practical common-sense feature, worth dollars to every contractor and builder in the country. It will contain perfectly clear drawings with full directions, for the execution of details for cornices, chimney tops, belt courses, arches, etc., all of common brick.

Limes, Mortars, and Cements, and, in connection, Mortar Colors, will be considered in a special department, which will contain, among other features, the revised and enlarged series of notes on these materials by Prof. F. W. Chandler of the Massachusetts Institute of Technology.

Roofing Tiles will also come in for special treatment, with notes as to various patterns, and their weathering qualities; also papers by practical roofers upon methods and cost of laying the different makes in the market.

Throughout the general part of the paper, terra-cotta will occupy a place almost as important as that given to brick, and it will also have a special department in which new work will be illustrated by photographs of details made at the factory during execution of the work.

The details of clay manufacturing processes belong to another field, and are treated by special class journals; therefore THE BRICKBUILDER will confine its efforts to the general description of new processes and machinery, aiming to act as a guide for its readers to those manufacturers who can furnish the detailed information desired.

In spite of an increase to nearly double the former size, the subscription price will remain the same, $2.50 per year in advance, subscribers' copies being mailed flat with pasteboard protection. There are in stock a few complete volumes for 1892, handsomely bound, which will be furnished new subscribers for $2.50, postpaid. Make all remittances payable to

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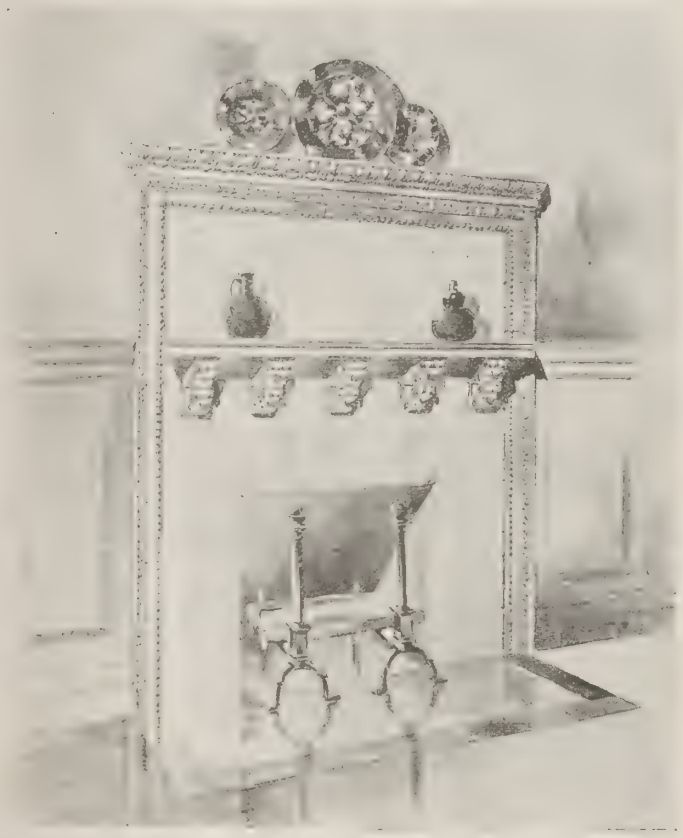

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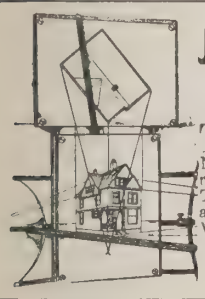

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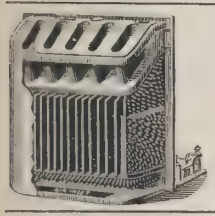

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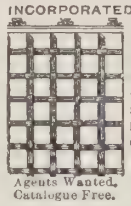

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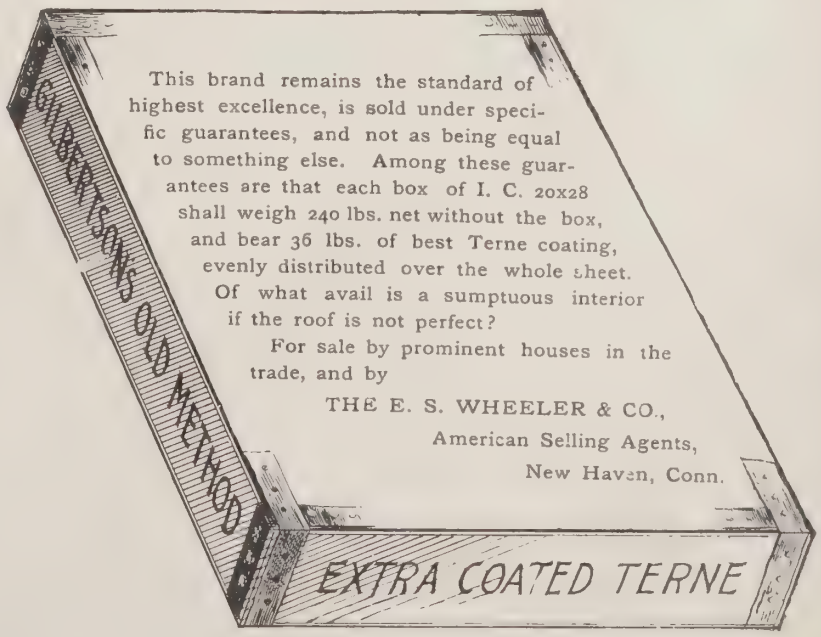

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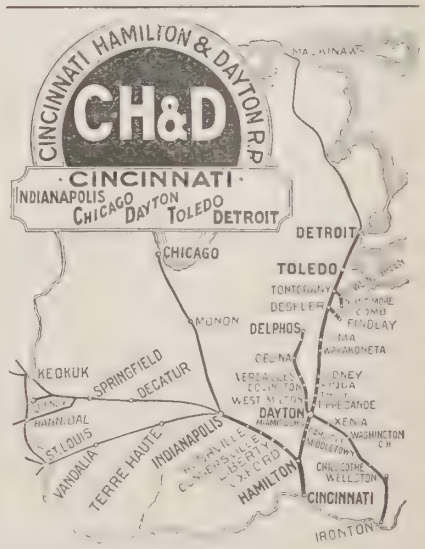

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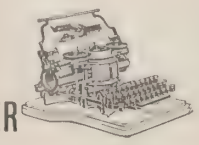

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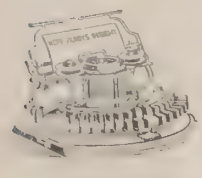

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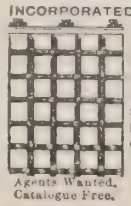

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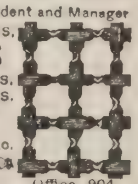

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